GW

TECHNIQUES

FOR

CONDUCTING AN AUDIT

OF

RADIATION HEALTH PROGRAMS

ABOARD NUCLEAR SUBMARINES

by

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Preface

The intent of this guide is to provide techniques which have been found useful in auditing Radiation Health Programs. The general organization is by topics. Under each topic there is a general discussion and a listing of specific techniques.

The guide assumes that the reader has a basic familiarity with each topic. The techniques are not listed in any specific order under each topic although generally, the sequence described has a certain flow to it. While reading the listing of techniques the reader should not expect continuity of thought but rather should consider each technique separately.

In order to make the guide more useful to study and review, two sections have been added. One section contains all standard forms referred to in the guide, which allows better visualization of the techniques described. The other section contains sample forms or formats to familiarize the reader with the usual "look" of the required forms. To eliminate the need to classify this thesis, pages vii and ix of Appendix A have not been included but should be added by the reader.

Techniques which provide a check-point which crosses separate areas of the Program are indicated by an asterisk in the margin. In general, items which are to be "assured" or "verified" are required elements of the Program.

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I. Introduction

The utilization of nuclear energy has had significant beneficial effects on United States military maritime operations. These effects stem not only from the deterrent forces of strategic ballistic missiles but also from the applications of nuclear power to naval propulsion systems. The advent of nuclear power was responsible for the development of the true submarine.

In conjunction with the benefits of nuclear energy we are, however, forced to deal with certain hazards from ionizing radiation. While few would question the risks versus benefits in the environment of a war, under the current peace we so fortunately enjoy, the American people demand and deserve a careful assessment of the benefits of nuclear energy and careful control of the risks associated with ionizing radiation.

The risks from ionizing radiation in general terms are health risks which must be considered in two categtories. The first category is the health risks wich can be passed to the population at large; the second consists of those risks to which the individual who works in or around sources of ionizing radiation can be exposed.

The Medical Department of the United States Navy, having been tasked with providing for the health of American citizens while in the Navy has also been tasked with protecting Naval personnel from the harmful effects of ionizing radiation under the Radiation Health Program as set forth in NAVMED P-5055. This primary objective of the Program is accomplished by providing carefully prepared, legally substantial documentation of the radiation exposures received by Naval personnel in order to assure the American public that the Navy's use of nuclear energy is in accordance with the limitations set forth by the Nuclear Regulatory Commission and by providing legally substantial documentation of individual exposures both to protect the individual from unacceptable risks of personal damage from ionizing radiation and to protect the Navy from litigation based on a personal injury claim.

The most difficult yet most significant function in accomplishing these objectives is in the performance of audits of a unit's Radiation Health Program. While basic directives give guidance on conducting an audit of the Radiation Health Program, the guidance is of a general nature and gives little insight into methods of auditing a program. The purpose of this thesis is to provide a compendium of techniques which are useful in auditing the Radiation Health Program. These techniques were developed for units under COMSUBLANT jurisdiction and in some cases will only be applicable to those units. COMSUBLANT specific techniques will be so indicated in the text. The largest part of the thesis will be applicable to all Navy Radiation Health Programs.

Courtesy. A semi-annual audit of a unit's Radiation Health Program by an agency external to the command is required. The audit is intended to serve an instructive function and in extreme cases may initiate punitive action. It is customary that prior to beginning the audit, the inspectors meet the Commanding and Executive Officers of the unit and brief them on the intent and the scope of the audit. This not only meets the demands of protocol but also helps to establish a cooperative attitude toward assuring an effective radiation health program. Remember that the whole idea is to provide an effective program not to embarrass any particular individual!

Another useful preliminary step is to have the unit accumulate all materials which will be reviewed during the audit. Doing this prior to the audit assures that the command does indeed have the necessary information and that time will not be wasted searching for mislaid materials. Appendix (B), pages i-iii, presents a format cover letter and an enclosure delineating all materials required for conducting an audit.

II. Health Records

The Health Record is the core of the Radiation Health Program. For each individual, his record contains all pertinent information regarding his health risk from ionizing radiation, the changes of his physical condition during the period of his radiation exposure and the total exposure received while working with or around ionizing radiation. As such, the accuracy and clarity of radiation related data in the Health Record is essential. The Health Records of both Propulsion Plant and Nuclear Weapons Occupational Workers as well as those of all Non-occupational Workers who have been monitored should be reviewed. Deficient exams (i.e., missing information) prior to 1 June 1979 shall not be corrected. Administrative procedures prior to implementation of ACN-4, NAVMED P5055 shall comply with standards in effect at the time the physical was completed.

DD1141. The DD1141 is the standard form which serves as a continuous record of an individual's exposure while in the Navy. A Health Record may contain four different types of DD1141: (1) Computerized DD1141 printouts, (2) forms DD1141 for whole body and skin doses, (3) Addendum Forms DD1141 for other than whole body exposure (i.e., hands, lungs) and (4) Addendums to DD1141 amplifying data for incidents of contamination. The general instructions for completing the form DD1141 are contained on the reverse side of the form and are self-explanatory.

Techniques:

1. Using a calculator assure entries in Blocks 12 and 13 are correct, line by line, from the entry of the Receipt Audit on board the current unit or at least from the Annual Verification 1 year previously (at least 12 months).

2. Review Blocks 7 and 8 to assure that the exposure periods do not overlap on successive entries.

3. Assure that entries in Blocks 7 and 8 are made at least quarterly and that they correspond to the quarters described in NAVMED P-5055.

4. Assure that a Receipt Audit on board the current command was performed and that a machine audit was performed at least annually.

5. Assure that entries in Block 14 change with the entry which coincides or follows the birth date listed in Block 5 and that the calculation is correct. For individuals between 18 and 19 years old the block should be completed in accordance with NAVMED P-5055 5-2(2). Individuals less than 18 years old and non-occupational workers should have "less than 00.500 rem/yr" in Block 14 (COMSUBLANT).

6. Review the entire form for lineouts, write-overs or illegible entries. None of these entries are permissible. The line and block containing the error should be marked with an asterisk and a dated entry explaining the error should appear in the remarks section Block 16 (NAVMED P-5055 5-2(2)(i)).

7. The remarks section, Block 16, should be reviewed to identify entries for lost/damaged thermoluminescent dosimeters and incidents of internal or external contamination.

(a) Entries for Lost/Damaged TLDs should contain: (1) The reason for the estimate, (2) the estimated dose, (3) the basis for the assigned dose, (4) the period of exposure which is being estimated and (5) the signature of the Radiation Health Officer. Record the names of individuals with Lost/Damaged entries on the DD1141, to assure the Lost/Damaged TLD report has been properly completed and retained, at a later step in the audit, and to assure that a similar entry excepting signature has been made in the remarks section of the Situational or Annual Report to BUMED (NAVMED 6470/1). *

(b) Remarks regarding internal contamination should contain: (1) A description of the analysis equipment, (2) The system's minimal detectable activity, (3) The isotopes monitored, (4) the microcuries or nanocurries present, and (5) The anatomical locations monitored. This information may require a form DD1141 marked "Addendum to DD1141" to contain all the information. The same information listed in Block 16 should appear in the remarks section of the Situational or Annual Report to BUMED (NAVMED 6470/1). *

7. (c) Remarks regarding External Contamination in excess of 450 micromicrocuries of beta, gamma emitting contamination or 50 micromicrocuries of alpha emitting contamination should contain: (1) Isotope monitored, (2) Microcuries or nanocuries present, and (3) The anatomical location of the contamination. This information may require a form DD1141 marked "Addendum to DD1141" to contain all the information. The same information listed in Block 16 should appear in the remarks section of the Situational or Annual Report to BUMED (NAVMED 6470/1). *

8. Only computer printout DD1141s reporting exposures for separate exposure periods need be retained. Assure that the Total Lifetime transferred to Form DD1141 is the same as the final Total Lifetime on the most recent Computer DD1141.

In general, once the remarks section of DD1141 is filled up, additional space can be obtained by the use of an Addendum or Special DD1141.

SF88. The general instructions for the conduct of a physical examination and completion of the Form 88 are contained in NAVMED P-117 and NAVMED P-5055. For SUBLANT units additional requirements are imposed by COMSUBLANTINST 6470.2A. Current policy is that administrative errors may be corrected by initialed lineouts IAW NAVMED P-117. The general audit guide for a review of SF88 is contained in COMSUBLANTINST 6470.2A

Techniques:

1. Under current directives physicals for occupational workers are to be repeated every three years. As of 31 December 1982, the deadline for compliance, all Naval occupational workers should have a physical conducted sometime between 1 January 1979 and 31 December 1982 and then every three years afterwards. Assure that the date in Block 6 meets these requirements.
2. Block 5 should read Occupational Exposure to Ionizing Radiation () PE, RE, SE, TE.
3. Blocks 18 through 42 should be individually marked. A vertical line more often than not fails to clearly indicate that all blocks are checked and is much less legally substantiated.
4. Blocks where portions of the examination are not performed or tests are not conducted (i.e., pelvic, EKG, chest X ray) should be marked "NE".
5. Specific values for Urinalysis Block 45 are not set forth in NAVMED P5055; however, for SUBLANT units specific value limits have been inferred based on COMSUBLANTINST 6470.2A, Appendix B to Enclosure (5). Particularly specific gravity must be greater than 01.012 and less than 3 WBCs and no RBCs in the urine.
6. The CBC differential count, Block 50 should represent 100%. Verify by adding the individual percentages listed.

1. Block 77 should be clearly marked "is qualified for Occupational Exposure to Ionizing Radiation and to perform all the duties of his rate/rank at sea or in the field".

2. Both Blocks 79 and 82 must be signed. Block 79 may be signed by a physician assistant. Block 82 must be signed by a Physician.

3. Assure that the date in Block 6 agrees with the date of the SF93 Block 6 and Block 25. *

4. Examinations which were deficient in scope and which have Block 5 marked Occupational Exposure to Ionizing Radiation may be corrected in Block 73. Entries should contain: (1) The date of the entry, (2) The examining locality, (3) Statement of significant interval history, (4) Information to correct the deficiency, (5) Statement of CD/NCD, and (6) The Physician's signature.

5. For any physical marked Occupation Exposure to Ionizing Radiation (TE) in Block 5 review the DD1141 in the Health Record to assure that no further exposure has occurred after the date of the physical examination. It is suggested that a notation on SF88 Block 25 be made indicating the date and facility where the slit lamp, if required, was performed and an indication of CD or NCD. *

SF93. The general instructions for the conduct of a medical history and completion of the Form 93 are contained in NAVMED P-117 and NAVMED P-5055. Administrative errors should be corrected by initialed lineouts IAW NAVMED P-117.

Techniques:

1. Block 5 should read "Occupational Exposure to Ionizing Radiation ()" PE, RE, SE, TE.

2. The date in Block 6 should coincide with Block 25 on the same SF93 * and with Block 6 on the corresponding SF88.

3. Each item in Blocks 9, 10, 11 and 15 through 24 which have been marked with a positive response should have a statement by the physician in Block 25 that the item is CD or NCD.

4. If appropriate, Block 12 should be marked "NE".

Addendum SF88. An examination listing Occupational Exposure to Ionizing Radiation in Block 5 which is deficient but on which there is inadequate space in Block 73 should be corrected by an Addendum SF88. In addition, an examination for some other purpose which is less than one year old may be converted for use as a Radiation physical by the use of an Addendum SF88.

Techniques:

1. The following entry should appear at the top front page of the Addendum "Addendum to Medical Examination Dated _____."
2. Blocks 1-17, 77, 79, 82 and the appropriate Blocks to correct the deficiency should be completed.
3. Block 5 should read "Occupational Exposure to Ionizing Radiation ()" PE, RE, SE, TE.
4. Block 6 should contain the date on which the Addendum is being signed.
5. The Addendum should appear in the Health Record immediately following the SF88 to which it applies.
6. The SF88 which is being corrected should indicate that there are attached sheets in the space provided apposite Block 82.
7. Blocks not specifically listed under (2) and not required to correct the dificiency may be left blank.

Addendum SF93. Radiation physical histories which are deficient or histories for another purpose which are deficient in scope may be corrected with an Addendum SF93.

Techniques:

1. The following entry should appear on the top front page of the Addendum SF93 "Addendum to Medical History Dated _____."
2. Blocks 1-7, typed or printed name of both physician and individual, signature of both physician and individual and all blocks required to correct the deficiency should be marked. If the original history was for a Radiation Physical no other Blocks need be marked. If the purpose of the original SF93 was for other than Occupational Exposure the SF93 should be completed in its entirety.
3. All Blocks which indicate a positive response should have a comment in Block 25 regarding CD/NCD by the physician.
4. The date in Block 25 should indicate the date the Addendum was signed.
5. The Addendum SF93 should appear in the Health Record immediately following the original SF93.
6. The number of attached pages should be indicated in the space provided on the lower right back of the original SF93.

SF513. Special evaluations by medical consultants and required Slit Lamp Examinations are recorded on Form 513.

Techniques:

1. The date of the Slit Lamp Examination should be within one year preceeding the Radiation Physical Examination. Slit Lamp Examinations dated after the Radiation Physical should appear as a comment on an Addendum SF88 to the Radiation Physical.
2. The Slit Lamp Examination should be reviewed to assure that disqualifying opacities as delineated in NAVMED P-5055 2-6 (5) are indicated as such on the Radiation Physical.
3. A Slit Lamp Examination should be performed with each PE, the most recent RE if the PE was performed prior to ACN-4, P-5055, the TE, and when required by the examining physician.

SF600. A thorough audit will include a review of other entries in the Health Record which indicate a medical condition which should be further evaluated to determine if the individual is qualified for Occupational Exposure to Ionizing Radiation or which may be disqualifying. This procedure frequently discovers bizarre skeletons in the Health Record closet and is certainly a lesson in the attributes of good penmanship.

Health Record Jacket. The front of the Health Record Jacket of all occupational workers and of all non-occupational workers who have exceeded radiation exposure limits should contain the statement "Termination radiation medical examination required in accordance with NAVMED P-5055" written in the block in the upper right corner marked "Patient's Identification".

III. Correspondence

Visitor Statements. The Visitor Data Record/Medical Statement serves as a central record for personnel not permanently assigned to the ship. A format for the visitor form is provided as page iv of Appendix B. It should contain the following information:

1. Individuals name, SSN, birthdate and the complete address of the custodian of the individual's Health Record.
2. A statement of their current exposure.
3. A statement of medical qualification to be exposed to ionizing radiation.
4. A statement certifying training knowledge regarding exposure limits, areas the individual may enter and that the individual is aware of the risks of exposure to ionizing radiation.
5. It should indicate whether the parent command does or does not maintain a dosimetry program.
6. A statement of intruction concerning radiation exposure to the unborn child when applicable.
7. The individual's signature and date.
8. The type TLD issued, the exposure period, TLD serial number, the exposure assigned, the date the report of exposure was forwarded to the parent command as required and the signature of the Radiation Health Officer. As such, this document not only fulfills specified requirements but also serves as a valuable source of information for the compilation of other reports.

Techniques:

1. For SUBLANT units Appendix A to Enclosure (3), COMSUBLANT 6470.2A must be utilized.
2. A list of visitors should be compiled in the following categories: (a) Visitors for whom the parent command maintains a dosimetry program. For these individuals a Report of Exposure to the parent command (Dose transmittal letter) dated within 15 days of receipt of exposure data should be on record for review. (b) Visitors who are not reported by any other command. These individuals should have been reported on a Situational Report to BUMED within 30 days of receipt of exposure information.

Dose Transmittal Letter. Reports of exposure of individuals to other commands are required in two circumstances: (1) Visitors who receive exposure at the command must have all information necessary for making the DD1141 entry in his Health Record for that exposure period forwarded to his parent command, and (2) Personnel who are transferred from the command prior to recording their final exposure received at the command in the Health Record must also have all necessary information for making the DD1141 entry forwarded to the new command. COMSUBLANTINST 6470.2A Appendix B to Enclosure (3) is a suitable format for this letter and is contained on page v of Appendix B.

Techniques:

1. Assure that all required information is present using page v of Appendix B to this Guide.
2. Verify all information using the Exposure Record Cards or LiFI report (NAVMED 6470/3) for the individual. *
3. For transferred personnel, verify all information against the appropriate Situational Report to BUMED (NAVMED 6470/1) which should be completed within 30 days of receipt of exposure information. If the individual was transferred after having been reported in an Annual Report (NAVMED 6470/1) and was not monitored subsequent to the exposure period on the Annual Report, no Situational Report is required. In this case verify information against the Annual Report. *
4. Dose transmittal letters should be dated within 15 days of the receipt of exposure data.

Termination Statements. When a person is released from active duty after having received exposure to ionizing radiation from sources controlled by the Navy, a statement of his total occupational radiation exposure must be provided to the individual. In this case occupational exposure is defined IAW NAVMED P-5055 as any exposure to ionizing radiation.

The termination statement is a legal record providing both the individual and the Navy with a summary statement of all exposure received by the individual during the current period of employment by the Navy. Its accuracy is extremely important. The statement must contain the following information:

1. The statement "This report is submitted in accordance with NAVMED P-5055, Radiation Health Protection Manual".
2. The name, SSN and date of birth of the individual.
3. The dates of employment (day, month, year), identification of the activity at which the exposure was incurred and the exposure actually received at that activity.
4. The statement "You should preserve this report for future reference".
5. The total cumulative exposure received by the individual during his service with the Navy.
6. The types of radiation involved.
7. The parts of the body exposed.
8. The statement "Your permissible life-time whole body dose calculated in accordance with universally accepted standards (Maximum permissible dose = 5(N-18) is _____ rems.
9. If the individual has been monitored for internally deposited radioactivity, the results of the examination shall be summarized in the termination statement including: (a) Date of the examination, (b) The minimum detectable activity of the analysis system, (c) The isotopes monitored, (d) the microcuries or nanocuries present, and (e) The anatomical locations monitored.

COMSUBLANTINST 6470.2A, Appendix A to Enclosure (4) is a suitable format for this letter and is contained as page vi of Appendix B of this Guide.

Techniques:

1. Assure that all required information is present using page vi of Appendix B to this Guide.
2. Verify all possible information by comparing it with information reported on the appropriate Situational Report (NAVMED 6470/1) which should be completed within 30 days of receipt of exposure information. If the individual was transferred after having been reported on an Annual Report (NAVMED 6470/1) and did not receive any exposure subsequent to the exposure period on the Annual Report, no Situational Report is required. In this case verify the information against the Annual Report.
3. Termination Letters should be dated within 15 days of the receipt of exposure data.

IV. Records of Exposure

The records of exposure form the nucleus of radiation exposure data for the Navy. Each document must be retained for a specified period of time. The bulk of the exposure data is retained by BUMED in the form of Situational and Annual Reports (NAVMED 6470/1).

Situational Report. A Situational Report of exposure data is submitted for any individual who is transferred, retires or terminates employment. The required information and instructions for completing the form are continued on the back of the form NAVMED 6470/1. The report is retained indefinitely.

Techniques:

1. From the lists of individuals composed while auditing the Visitor Statements, Dose Transmittals and Termination Statements verify that the following individuals have been reported on the Situational Report:

   (a) Those persons whose parent commands do not maintain a dosimetry program.
   (b) Those persons who have separated from service.
   (c) Those persons transferred from the command.

2. If an individual is separated or transferred after the Annual Report is completed but is not subsequently monitored at the command, his name will not appear on a Situational Report because all exposure received by the individual at the present command was already reported on the Annual Report.

3. Using the immediately preceeding Annual Reports: *

   (a) Verify all identifying information for each individual.

   (b) Verify that the date entered in Block 8 of the Situational Report does not pre-date that listed in Block 9 of the preceeding Annual Report. This would represent dual reporting of exposure.

   (c) Verify that the sum of Block 14, "Total Lifetime" of the Annual Report plus Block 13, "This Period" of the Situational Report is equal to Block 14, "Total Lifetime" of the Situational Report.

   (d) Verify that Block 4 "Date Prepared" of the Situational Report is within approximately 30 days of each date listed in Block 9 "Period of Exposure To" of the Situational Report IAW NAVMED P-5055, 5-3 (2) (a). The report is required to be completed within 30 days of the receipt of final exposure data.

4. From the list of individuals produced when reviewing Lost Damaged TLD reports and reports of contamination, assure that summary information is included for the reported exposure in the Remarks section, Block 15. *

Annual Report: An Annual Report of Exposure data is submitted for all personnel on board the command 31 December who have been occupationally exposed to ionizing radiation during the previous calendar year while assigned to the reporting activity. The required information and instructions for completing the form are contained on the back of the form NAVMED 6470/1. The report is retained indefinitely.

Techniques: Using the previous year's Annual Report:

1. Verify all identifying information for each individual.
2. Verify that the date entered in Block 8 "Period of Exposure From" of the current Annual Report does not pre-date that listed in Block 9 "Period of Exposure To" of the preceeding Annual Report. This would represent dual reporting of exposure.
3. Verify that the sum of Block 14 "Total Lifetime" of the preceeding Annual Report plus Block 13, "This Period" of the current Annual Report is equal to Block 14 "Total Lifetime" of the current Annual Report.
4. Verify that Block 4 "Date Prepared" of the Current Annual Report is within approximately 30 days of each date listed in Block 9 "Period of Exposure To" of the report IAW NAVMED P-5055, 5-3 (1). The report is required to be completed within 30 days of the receipt of final exposure data.

5. From the list of individuals produced when reviewing lost damaged TLD reports and reports of contamination assure that summary information is included for the reported exposure in the Remarks Section, Block 15.

Exposure Record Cards: Exposure data resulting from the Thermoluminescent Dosimetry Program is maintained on four documents. It may be recorded on Quarterly cards or on an Exposure Record Card, or initially recorded on a Monitor Card then transcribed to an Exposure Record Card or on the Thermoluminescent Dosimetry Evaluation form NAVMED 6470/3. Exposure Record Cards and Monitor Cards are used with Calcium fluoride dosimeters; NAVMED 6470/3 is used with the Lithium fluoride dosimeter.

Monitor Card: Monitor Cards are used to temporarily record exposure results when a control point entry is required and exposure record cards are not maintained by the control point watch. Information on the Monitor Card is subsequently transferred to the Exposure Record Card. The format of the two cards is esentially the same and they are illustrated in NAVSEA 389-0153, Article 233, Pages II-28 and II-29. Monitor cards allow for the correction of clerical errors as the exposure data is transcribed onto the Exposure Record Card. This results in more legible data and avoids soiling the cards at the work site. It requires that much of the work of maintaining the cards be done twice. Once the information is transcribed to the Exposure Record Card, and verified, the Monitor Card is disposed of.

The general instructions for completing the monitor card are described in Article 233 of NAVSEA 389-0153.

Techniques:

1. Block 5 should contain the most limiting local level which should be determined for the ship's Radiological Control Instructions.
2. If Block 5 has the initial level lined out and a higher number recorded in the Block, assure that prior authorization has been granted to that level in writing on the back of the card.
3. Block 5 should show a decreasing number over a period of time as it is to be updated by subtracting the individual's total exposure for the period in Block 10 from the level originally listed in Block 5.
4. Blocks 6 and 7 should show month/day/year dates; Blocks 11 and 15 should show month and day.
5. If an RC entry is indicated in Block 13 assure that Block 20 "Control Point Entry Authorized" is initialed.
6. Assure that the "Date Read" in Block 11 is within 24 hours of the time and date recorded in Blocks 15 and 16.
7. Block 17 should be crossed out after the TLD has been read. No other cross outs are permitted and lead to confusing and inaccurate exposure data records.

Exposure Record Cards: The Exposure Record Card, sometimes called a 15 Alpha card, is the retained record of Calcium fluoride dosimetry data. It is retained for a period of three years. The general instructions for completing the Exposure Record Card are contained in Article 237 of NAVSEA 387-0153.

If the unit has used Monitor Cards only Blocks 1 through 8, 9 through 12 and Block 20 of the Exposure Record Card need be completed.

Techniques:

1. Block 5 should contain the most limiting local level which should be determined from the ship's Radiological Controls Instructions.
2. If Block 5 has the initial level lined out and a higher number recorded in the Block, assure that prior authorization has been granted to that level in writing on the back of the card.
3. Assure that the "Total Period" recorded in the last entry in Block 10 does not exceed the level listed in Block 5.
4. Blocks 6 and 7 should show month/day/year dates; Block 11 and 15 should show month and day.
5. If an RC entry is indicated in Block 13 assure that Block 20 "Control Point Entry Authorized" is initialed.

6. Assure that the "Date Read" in Block 11 is within 24 hours of the time and date recorded in Blocks 15 and 16.

7. Block 17 should be crossed out after the TLD has been read. No other cross-outs are permitted and lead to confusing and inaccurate exposure data records.

8. Compare total exposures listed in the last entry of Block 10 and the exposure period dates listed in Blocks 6 and 11 with the dates and exposures recorded on the Form DD1141 in the individual Health Records.

9. Assure that Block 18 "RCO Init" has been initialed by the Radiological Controls Officer monthly.

10. Assure that if the Exposure Record Card indicates that TLDs were processed monthly or more frequently that the card was only issued for one quarter, Block 5 to Block 11.

11. Review exposure record cards for TLDs which showed abnormal glow curves when being read. This exposure record card should have a strip chart attached with: (a) The serial number of the TLD, (b) The date and time it was read, (c) The name of the individual assigned that TLD recorded on the strip chart.

Lithium Fluoride Evaluation Record (NAVMED 6470/3): The Lithium Fluoride Dosimetry System is described in NAVMED P-5055. These documents are read at the BUMED Dosimetry Center. The general instructions for completing the Evaluation Record are listed on the back of the Form NAVMED 6470/3. This record is retained for three years.

Techniques:

1. Two control LiF TLD cards from the same groups as the issued TLDs are sent with the issued TLDs to be read to determine background radiation. Assure that the control Lif TLD cards are listed first in sequence in Blocks 4 through 6.
2. Assure that the issue period Block 7 does not exceed up to seven weeks except as allowed IAW NAVMED P-5055, 6-6 (6) (a).
3. For units assigned BUMED Area Monitors (BAMS) assure that the cards from the monitors with the aluminum side up are listed in column 5 and those with the black side up are listed in column 6. Assuring that the card listed was indeed aluminum or black side up is not possible but identification numbers should at least appear in separate columns.
4. Verify exposure data and issue periods listed on Form 6470/3 against the entries on Form DD1141 in individual Health Records.

V. Dosimetry

Dosimetry: The second mainstay of the Radiation Health Program is the dosimetry program. Accurate records of exposure are useless if the data recorded has no relationship to reality. The maintenance of a good thermolulminescent dosimetry program depends on good work practices and quality assurance by the individuals who read the TLDs.

The quality control for the Lithium fluoride TLD program rests primarily with the BUMED Dosimetry Center. On the other hand, control for the Calcium fluoride program rests on the Engineering Laboratory Technicians, Medical Department Representative, Engineer and Executive Officer of each command.

The specifications for types of dosimeter to be worn for SUBLANT units is contained in COMSUBLANTINST 6470.2A, Enclosure (2). The source documents for these requirements are NAVSEA 389-0153, Article 233 and NAVSEA TW120-AA-PRO-10, Articles 311 and 312. Descriptions of the principles of operation and the procedures for reading each type of TLD are contained in NAVELEX 0967-LP-456-6010 and NAVMED P-5055, Chapter 6.

A general outline of audit procedures of the dosimetry program is contained in COMSUBLANTINST 6470.2A, Enclosure (5), Appendix A and Enclosure (6). Many of the check items on these outlines are evaluated by procedures previously described in the Guide.

A self-evaluation of the Dosimetry Program shall be conducted at least semi-annually by the organization. The Radiation Health Officer aboard SUBLANT units is required to conduct a TLD procedures review using Enclosure (6) of CSL 6470.2A at least quarterly.

Completed Exposure Record Cards, completed TLD Reader Check Record Worksheets, and completed forms for TLDs read quarterly shall be retained for three years. After transcription to form DD1141, Exposure Record Cards, TLD Reader Check Record Worksheets and forms for TLDs read quarterly need not be retained on board ship.

Techniques:

1. Using the Exposure Record Cards, compose a list of dates on which TLDs were read. Indicate how many TLDs were read on each date using tally markings. Using the TLD Check Record Worksheets for the comparable time period, assure that that least one Reference Light Source Value Check was performed on each date a TLD was read.
2. If the above list of dates reveals that numerous TLDs were read on a single date, assure that several Reference Light Source value Checks were performed on that date. This audits the requirement to do a Reference Light Source Value Check Hourly when reading TLDs. Approximately 20 to 30 TLDs may be processed in one hour.

3. Compose a list of dates when Calibrated Exposure Checks were performed from the TLD Reader Check Records Worksheet. Assure that a Calibrated Exposure Check was performed weekly. If Calibrated Exposure Checks are found greater than seven days apart, no TLDs should have been read on the days greater than one week after the last Calibration Exposure Check was performed.

4. Assure that the TLD Reader Check Record Worksheet contains the following information: (a) TLD reader serial number, (b) Ship's name, (c) The Reference Light Source calibration reference value recorded on the face of the TLD reader, (d) Assure that the plus/minus 1% and plus/minus 25% of the Reference Light source Value computed in Section I are correct, and (e) The signature of the Radiological Controls Officer.

5. Using the unit's TLD calibration log, compose a list of all TLDs on board which are due for calibration. Compare this list of TLD serial numbers with TLD serial numbers recorded in Block 8 of the current stack of Exposure Record Cards to detect any TLDs which have been issued but which are due for a calibration check.

6. Observe the TLDs issued to several individuals and in the ready for issue lot to assure the legibility of the serial number and that a calibration sticker is affixed to the TLD. The calibration sticker should indicate the date the last calibration was performed and the date the next calibration is due.

7. Observe several individuals to assure that the proper TLD is being worn and that it is being worn correctly. Also question several individuals to determine that they know proper procedures to follow in the event that they lose or damage the TLD.

8. Preexposed TLDs should be obtained prior to the audit by the inspector. As a minimum, three 75 mrem TLDs and one preexposed TLD for evaluation of glow curve should be available per person reading. Observe several individuals qualified to read TLDs in the performance of TLD Reader Checks and in reading preexposed TLDs. This review should also evaluate the individual's accuracy in reading the strip chart without having observed the digital display on the TLD Reader (accomplished by covering the digital display during the read cycle). Specific requirements regarding pre-exposed TLDs for SUBLANT units are set forth in CSL 6470.2A, Enclosure (2) 8b. A useful checklist to be used while observing TLD Reader Proficiency, CP-1112/PD, is contained on page vii of Appendix B.

9. Determine that individuals qualified to read TLDs know the following information:

   (a) The correct procedure to follow if any reference light check varies from the calibration label value by more than +/- 25% of the label value (NAVSEA 389-0153), Articles 233-4-C(2)).

   (b) The procedures to follow if the first pre-exposed 75 mrem TLD read on the Calibrated Exposure Check of the CP-1112/PD is not within +/- 15% of the calibrated exposure (NAVELEX 0967-LP-456-6010 3-3 b(c).

(c) The requirement that the strip chart recorder data and the digital readout from the CP1112/PD agree within +/- 25% and the action to be taken if they do not agree. (NAVELEX 0967-LP-456-6010,3-3,C(4)).

(d) The requirements for the calibration sticker on the TS-1189 (NAVSEA 389-0153, Article 233-4-d).

(e) The procedures to be followed when an abnormal glow curve is observed (NAVSEA 389-0153, Article 233-4-c(5)).

10. Assure that the TLD reader has been calibrated within the preceeding 12 months.

11. Observe the calibration sticker on the TS-1189. Assure that the date it was calibrated is within one week of the calibration date listed on the CP-1112/PD TLD Reader Calibration sticker. Also assure that the sticker lists: (a) The exposure rate, and (b) The time required to expose a DT-526/PD to a 75 mrem level. This calibration must be conducted at least annually.

VI. Man-Rem Reduction

A frequently overlooked aspect of the Radiation Health Program is the Man-Rem Reduction Program. It is needless to say that the risks from occupational exposure to ionizing radiation are least when the levels to which individuals are exposed are the least possible. Reducing exposure is a continuous process requiring continuous evaluation as the levels of competence of individuals and the work practices required change. Managers should consider Rem assets to be one of the most limiting resources when planning work in radiation areas.

Man-Rem Reduction planning occurs on two general levels, the first is that of overall Man-Rem expenditure by the Command, the second is that of Man-Rem expenditure for each particular job. The Man-Rem Reduction Program should include:

1. A Man-Rem Reduction Instruction which specifies: (a) Local exposure levels, (b) Requirements for completing Man-Rem budgets for IMA and Refit periods, (c) Requirements for completing Man-Rem budgets for single jobs, and (d) Requirements for completing Man-Rem budgets for the current year. The instruction should specify any graphs or forms which are to be completed.
2. Records of the Man-Rem Program from preceeding years. These are the basis from which estimates of future expenditures are based. Records of unusual work, work in which the pre-work estimate and actual man-rem expenditure differed significantly and work which is frequently performed are of particular importance.

3. Records of work packages of jobs conducted during the current year. Guidance for these packages are contained in Appendix A of NAVSEA 389-0153 and COMSUBLANT Nuclear Propulsion Note number 6470-1 of May 1976. Each package should contain:

   (a) Pre-job planning - this should include radiation surveys, estimation of man, hours required to perform the job, evaluation of means of reducing exposure by pre-job training and temporary shielding and an estimation of the man-rem to be expected on the job.

   (b) On-the-job performance - this should include a review and comparison of man-rem expenditure estimates with the actual man-rem being expended and evaluation of the job to ensure good work and radiological control habits.

   (c) Post-job critique - this should include an evaluation of the actual man-rem expenditure to identify variations from pre-work estimates and their causes and to identify inadequate work practices which resulted in unnecessary rem expenditure and suggested modifications of these practices.

4. While not required a useful technique in Man-Rem reduction is to graph individual exposures and/or divisional exposures to allow for ready identification of personnel who may have poor work habits or of personnel or divisions which are being overused for radiation work.

VII. Decontamination

Procedures for decontamination and the equipment and supplies to be used to carry out these procedures are contained in BUMEDINST 6470.10. The items to be reviewed during the conduct of an audit are:

1. Assure that the command has a copy of BUMEDINST 6470.10.
2. Review any ship's instructions regarding contaminated casualties and decontamination procedures to assure compliance with BUMEDINST 6470.10.
3. Inventory the Decontamination Locker to assure all required supplies are present. A complete inventory list is contained on page viii of Appendix B.
4. Assure that the Medical Department Representative has adequate knowledge of decontamination procedures.

VIII. Training

Adequate training is the keystone of a successful Radiation Health Program. In those programs where training is poor, one is likely to find that the quality of the Radiation Health Program is poor. Training requirements can generally be divided into requirements for three groups:

(1) Individuals who do not receive occupational exposure from any source, (2) Individuals who receive radiation exposure routinely from work associated with Nuclear Propulsion Plants, and (3) Individuals who receive radiation exposure routinely from work associated with Nuclear Weapons.

Techniques: Auditing of training is accomplished by:

1. Assuring that training records meet the requirements of the following paragraphs.
2. Using the Sailing List designating the classification of each individual. Assume that the appropriate documentation of training is present for each individual.

COMSUBLANTINST 6470.2A, Enclosure (2) sets specific requirements for training and dosimetry for all SUBLANT units. The following paragraphs serve as more general guidelines.

Non-Occupationally Exposed Personnel: This group of individuals is required to be trained under three different articles. Article 106.3 and Article 208 (submarines and tenders) of NAVSEA 389-0153 and Article 205 of NAVSEA TW 120-AA-PRO-10. Individuals assigned to nuclear weapons capable submarines in SUBLANT are to be trained IAW Article 203 of NAVSEA TW120-PRO-10 vice Article 205 of the same manual.

For SUBLANT units training of non-occupationally exposed personnel must be documented using Appendix B to Enclosure (2) CSL 6470.2A which is contained on page ix of Appendix B of this Guide.

Techniques:

1. Article 106.3, NAVSEA 389-0153 - Training under this article should include:

   (a) The radiation environment of personnel outside radiation areas and outside the organization is not significantly affected by nuclear plant work.

   (b) The posting of radiation areas and know not to cross radiation barriers.

   (c) The specific areas they are not authorized to enter.

   (d) The description and meaning of radiation warning signs and tags and of yellow plastic.

   (e) That they are required to comply with instructions of radiological control personnel in the event of an incident or acciedent involving radioactivity.

   (f) This training shall be repeated for all personnel at least annually.

A format for documenting this training is contained on page xxiv of Appendix B to this Guide.

2. Article 208, NAVSEA 389-0153 - Training under this article should include:

(a) That exposure of the whole body should not exceed 00.125 rem per quarter or 00.500 rem per calender year.

(b) That the individual will wear a white TLD to verify that he will not receive occupational radiation exposure.

(c) That the individual is not permitted to enter high radiation areas, the shielded volume of the reactor compartment, controlled surface contamination areas or areas surrounding controlled surface contamination areas.

(d) That the individual is not permited to touch or directly handle radioactive material or containers or piping systems containing radioactive material except portable radiac equipment with attached sources.

(e) The individual shall be indoctrinated in the need to consult radiological control personnel when questions or incidents occur, the specific areas he is allowed to enter, the importance of not violating instructions on radiation warning signs or from radiological control personnel and the responsibilities of the Notices to Personnel (NAVSEA 389-0153, Article 104).

(f) The statement "I know of no medical disqualification which should prevent my receiving radiation exposure within prescribed Federal Standards."

(g) A statement of whether or not the individual has worn dosimetry equipment during the current quarter or calender year and the exposure received for the current quarter and/or year if it has been worn.

(h) This training shall be repeated at least annually.

3. Article 205, NAVSEA TW 120-AA-PRO-10 - Training under this article should include:

(a) The proper wearing of the dosimeter.

(b) Obeying radiological control boundaries.

(c) Minimizing time spent close to nuclear weapons.

(d) The individual is required to sign a form equivalent to Appendix C to NAVSEA TW 120-AA-PRO-10 which is contained on page x of Appendix B to this Guide.

(e) The statement "This ship is capable of carrying nuclear weapons. Studies in ships of this class have indicated that you will not receive more radiation than alowed a member of the general public. A radiological controls program is in effect to ensure radiation exposures are known and controlled. If you have further questions contact _____." (insert the name of the Nuclear Weapons Radiologicall Controls Officer).

(f) This training is to be repeated annually.

Nuclear Propulsion Radiation Workers: The specific requirements for training individuals who are occupationally exposed from nuclear propulsion plant sources are contained in Article 106, NAVSEA 389-0153.

All Engineering Department personnel (Engineering Watch Standers, Engineering Officer of the Watch, Engineering Laboratory Technicains) are trained IAW Article 106.1. Submarine Medical Department Representatives are trained IAW Article 107 as are certain Hospital Corpsman aboard tenders. Tender Radiologic Control Personnel are trained IAW Article 108.

For SUBLANT units personnel are trained IAW NAVSEA 389-0153, Article 106 have met the training requirements of NAVSEA TW 120-AA-PRO-10, Article 204. Training is usually documented using a Qualification card. The card should contain:

1. Results in the form of numerical scores for each person on all final written examinations and a master copy of each separate examination.
2. A summary statement of each person's performance during the final comprehensive oral examination and the areas covered, signed by the persons conducting the examination.

3. Records for each individual which indicate the successful performance of practical abilities delineated by italiczed subparagraphs in Articles 107 and 108. Each practical factor should be signed off and dated IAW NAVSEA 389-0153, Article 106.2g(3).

4. A signed statement certifying that the person has completed all requirements.

5. Signature of approving authority and date all requirements were completed.

Training shall be reverified every two years and a new training record shall be completed for each verification. Training records are retained for a period of three years. An audit of training records for propulsion plant occupational workers should assure:

1. That the above requirements for the qualification card are met.

2. That each card contains the specific topics delineated under Articles 106.1, 107 and 108 of NAVSEA 389-0153.

3. That the date of the most recent reverification training record is no more than two years old.

Sample qualification cards for ELT, TLD Reader and Article 107 are contained on pages xi-xviii of Appendix B.

Nuclear Weapons Radiation Workers: Training for individuals who receive occupational exposure to radiation primarily from sources associated with nuclear weapons are trained IAW NAVSEA TW 120-AA-POR-10, Article 204. In addition, nuclear weapons radiation workers in SUBLANT units shall be trained IAW NAVSEA 389-0153, Article 208 which is described under Non-occupational exposed personnel. Training under Article 204 should include:

1. The objectives of the Nuclear Weapons Radiological Controls Program.
2. The Biological effects of ionizing radiation to personnel (contained in Appendix A of NAVSEA TW 120-AA-PRO-10).
3. Minimizing exposure to radiation (man-rem).
4. Personnel dosimetry.
5. Responsibilities of personnel (contained in NAVSEA TW 120-AA-PRO-10, Article 107).
6. A written test on the above information.
7. This training is to be conducted annually.
8. Records of this training are to be maintained for three years.

A qualification card example which is useful for documenting this training is contained on page xxix of Appendix B to this Guide. Documentation of NAVSEA 389-0153, Article 208 training for Nuclear Weapons Radiation Workers in SUBLANT units shall be by Appendix A, Enclosure (2) COMSUBLANTINST 6470.2A which is contained on page xx of Appendix B to this Guide.

Visitor Training: The general requirements for training of visitors is contained in NAVSEA 389-0153, Article 240 and NAVSEA TW 120-AA-PRO-10, Article 207. A form containing all requirements of these two articles is contained in COMSUBLANTINST 6470.2A as Appendix A to enclosure (3). This form is contained on page iv of Appendix B to this Guide. This form is required for all SUBLANT units as documentation of required visitor training.

Nuclear Weapons Radiolocical Controls Officer: Each unit which handles nuclear weapons is required to have an officer designated in writing by the Commanding Officer as the Nuclear Weapons Radiological Controls Officer. This individual must have completed training conducted by the Nuclear Weapons Training Group.

IX. Reports

There are many reports associated with the Radiological Controls Program but there are only a few which both apply to the Radiation Health Program and occur on a frequent enough interval to require discussion. A listing of required reports are contained in NAVSEA 389-0153, Articles 124, NAVMED P-5055, 5-2 and 5-3 and NAVSEA TW 120-AA-PRO-10, Article 332.

Several important reports contain the results of audits of the Radiation Health Program. Experience has shown that timely, comprehensive auditing is a contributing factor toward a quality Radiation Health Program.

Monthly Dosimetry Report to the Commanding Officer: This report is due at the end of each month within 5 working days of TLD collection. It is submitted by the Radiation Health Officer via the Executive Officer. It should contain:

1. Personnel and posted TLD exposure records for ending month and quarter TLD issue periods.
2. Loss/damaged TLD reports.
3. Latest Lithium Fluoride TLD results.
4. All personnel on the Alert List.
5. Evaluation of abnormal or unusual exposures.

Appendix A to Enclosure (8) of COMSUBLANTINST 6470.2A is a suitable format and is contained on page xxi of Appendix B to this Guide.

Quarterly TLD Audit: A review of TLD procedures is to be conducted quarterly by the Radiation Health Officer. This audit should be conducted in conjunction with the Semi-annual internal and external audits and submitted to the Commanding Officer. Enclosure (6) to CSL 6470.2A is a guide for conducting this audit and is contained on pages xxii and xxiii of Appendix B to this Guide. Specific techniques from this Guide are useful as an augment to the SUBLANT Guide.

Annual Exposure Report NAVSEA (08): Specific requirements for this report are contained in Article 238, NAVSEA 389-0153.

Annual Exposure Report to NAVSEA (64): Specific requirements for this report are contained in Article 332, NAVSEA TW 120-AA-PRO-10.

Report of Semi-Annual Radiation Health Program Internal Audit: This audit is conducted by the Executive Officer and should review all areas of the Radiation Health Program described in this Guide. For SUBLANT units this audit should be conducted midway between external audits of the program.

X. Conclusion

The preceeding information has been compiled in an effort to provide a ready source of information on techniques for conducting an audit of the Radiation Health Program. Experience has shown that, while there are many other details which could be reviewed, if all of the listed items are correct there will be in all likelihood no major, irrecoverable discrepancies in the Radiation Health Program.

APPENDIX

A

RECORD OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION

FOR INSTRUCTIONS, SEE REVERSE OF SHEET.

1. IDENTIFICATION NUMBER	2. NAME *(Last, first, middle initial)*	3. SOCIAL SECURITY NUMBER	4. RANK/RATE TITLE OF POSITION	5. DATE OF BIRTH *(Day, month, year)*

PLACE WHERE EXPOSURE OCCURRED	PERIOD OF EXPOSURE		DOSE THIS PERIOD *(rem)* 1. Method of monitoring is presumed to be film badge reading unless otherwise specified under Item 16, "REMARKS."				ACCUMULATED DOSE *(rem)*		INITIAL
ACTIVITY	FROM *(Day-Mo-Yr)*	TO *(Day-Mo-Yr)*	SKIN DOSE *(Soft)*	GAMMA AND X-RAY	NEUTRON	TOTAL THIS PERIOD	TOTAL LIFETIME	PERMISSIBLE LIFETIME *5(N-18)*	PERSON MAKING ENTRY
6	7	8	9	10	11	12	13	14	15

16. REMARKS *(Continue on additional sheet if necessary)*

TO BE RETAINED PERMANENTLY IN INDIVIDUAL'S MEDICAL RECORD

INSTRUCTIONS FOR PREPARATION OF DD FORM 1141

ITEM

1. Enter file, service, badge, check, or clock number by which individual is currently identified.

2. Enter last name, first name, and middle initial. If the combination of last name and first name exceeds 19 spaces, enter last name and initials only.

3. Enter Social Security number.

4. Enter in not more than 10 spaces, rank, rate, grade, title or position that the individual is currently holding. Use standard service abbreviations, e.g., CAPT; MC; HMCS; HM1; SSGT; LCPL; etc. Abbreviate civilian occupation titles as necessary; e.g., Radiological Physicist to Rad Physic; Radiation Physiologist to Rd Physiol; Electrical Welder to Elec Wldr; etc.

5. Enter date of birth by day, month, and year, e.g., 21 Sep 1918.

6. Enter name of activity or unit.

7 and 8. "Period of Exposure." Enter the day, month, and year, e.g., 1 Oct 62.

7. Enter the day, month, and year exposure period began.

8. Enter day, month, and year exposure period ended.

9 through 12. "Dose This Period." Enter radiation dose received this period to three decimal places, e.g., 02.345 rem. All entries shall be made using five digits including zeros as necessary.

9. Enter skin dose *(soft)* which includes low energy gamma and x-ray of less than 20 KEV effective energy and beta radiation. Total skin dose is the visual addition of columns 9 and 12.

10. Enter gamma and x-ray dose greater than 20 KEV effective energy in rem.

11. Enter Neutron dose in rem.

12. Enter sum of items 10 and 11.

13. Add item 12 to previous item 13; enter total in item 13.

14. Enter permissible dose calculated from the age formula 5(N-18) rem, where N equals the present age in years.

15. Recorder certify entries by initialling.

16. Enter other pertinent information such as known exposure from internally deposited radioactive material or from any external radioactive sources. Describe briefly any activity or assignment bearing a potential for exposure and estimate dose-time relationships, if feasible. If this form is used for other than whole body and skin of whole body, specify the use; i.e., hands and forearms, feet and ankles, thyroid, etc. When recorded dose is not obtained from film badge readings, specify whether estimates were obtained from pocket dosimeters, area or air monitoring, bioassay, etc.

NOTE:

This record is required on all individuals who are employed by or are members of the Armed Forces and who have been or are being occupationally exposed to ionizing radiation. It shall be the responsibility of each activity of the Department of Defense having personnel so exposed to initiate and maintain this record in accordance with AR 40-14/BUMEDINST 6150.18 series/AFR 161-8/DSAR 4145.24.
(29 Sept. 1966)

☆U.S. Government Printing Office: 1980—703-100/7194 2-1

Standard Form 88
Revised 10/75
General Services Administration
Interagency Comm. on Medical Records
FPMR 101-11.806-8

REPORT OF MEDICAL EXAMINATION

1. LAST NAME—FIRST NAME - MIDDLE NAME			2. GRADE AND COMPONENT OR POSITION	3. IDENTIFICATION NO.
4 HOME ADDRESS (*Number, street or RFD, city or town, State and ZIP Code*)			5 PURPOSE OF EXAMINATION	6. DATE OF EXAMINATION
7. SEX	8. RACE	9. TOTAL YEARS GOVERNMENT SERVICE: MILITARY / CIVILIAN	10. AGENCY	11. ORGANIZATION UNIT
12. DATE OF BIRTH	13. PLACE OF BIRTH		14. NAME, RELATIONSHIP, AND ADDRESS OF NEXT OF KIN	
15. EXAMINING FACILITY OR EXAMINER, AND ADDRESS			16. OTHER INFORMATION	
17. RATING OR SPECIALTY			TIME IN THIS CAPACITY (*Total*)	LAST SIX MONTHS

CLINICAL EVALUATION

NORMAL	(*Check each item in appropriate column, enter "NE" if not evaluated*)	ABNORMAL
	18. HEAD, FACE, NECK AND SCALP	
	19 NOSE	
	20 SINUSES	
	21. MOUTH AND THROAT	
	22 EARS—GENERAL (*Ext. & ext. canals*) (*Auditory acuity under items 70 and 71*)	
	23. DRUMS (*Perforation*)	
	24. EYES—GENERAL (*Visual acuity and refraction under items 59, 60 and 62*)	
	25 OPHTHALMOSCOPIC	
	26. PUPILS (*Equality and reaction*)	
	27 OCULAR MOTILITY (*Associated parallel movements, nystagmus*)	
	28 LUNGS AND CHEST (*Include breasts*)	
	29. HEART (*Thrust, size, rhythm, sounds*)	
	30. VASCULAR SYSTEM (*Varicosities, etc.*)	
	31. ABDOMEN AND VISCERA (*Include hernia*)	
	32 ANUS AND RECTUM (*Hemorrhoids, fistulae*) (*Prostate, if indicated*)	
	33. ENDOCRINE SYSTEM	
	34. G-U SYSTEM	
	35. UPPER EXTREMITIES (*Strength, range of motion*)	
	36. FEET	
	37. LOWER EXTREMITIES (*Except feet*) (*Strength, range of motion*)	
	38. SPINE, OTHER MUSCULOSKELETAL	
	39 IDENTIFYING BODY MARKS, SCARS, TATTOOS	
	40. SKIN, LYMPHATICS	
	41. NEUROLOGIC (*Equilibrium tests under item 72*)	
	42. PSYCHIATRIC (*Specify any personality deviation*)	
	43. PELVIC (*Females only*) (*Check how done*) ☐ VAGINAL ☐ RECTAL	

NOTES (*Describe every abnormality in detail. Enter pertinent item number before each comment. Continue in item 73 and use additional sheets if necessary.*)

(*Continue in Item 73*)

44. DENTAL (*Place appropriate symbols, shown in examples, above or below number of upper and lower teeth.*)

Restorable teeth (e.g. 0 / 1 2 3 / 32 31 30 / 0) — *Non restorable teeth* (e.g. 1 2 3 / 32 31 10) — *Missing teeth* (e.g. X / 1 2 3 / 32 31 30 / X) — *Replaced by dentures* (e.g. X X X / 1 2 3 / 32 31 30 / X X X) — *Fixed Partial dentures* (e.g. (X) / 1 2 3 / 32 31 30 / (X))

RIGHT	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	LEFT
	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	

REMARKS AND ADDITIONAL DENTAL DEFECTS AND DISEASES

LABORATORY FINDINGS

45. URINALYSIS A. SPECIFIC GRAVITY			46. CHEST X-RAY (*Place, date, film number and result*)
B. ALBUMIN / SUGAR	D. MICROSCOPIC		
SEROLOGY (*Specify test used and result*)	48. EKG	49. BLOOD TYPE AND RH FACTOR	50. OTHER TESTS

88-118

MEASUREMENTS AND OTHER FINDINGS

51. HEIGHT	52. WEIGHT	53. COLOR HAIR	54. COLOR EYES	55. BUILD: ☐ SLENDER ☐ MEDIUM ☐ HEAVY ☐ OBESE	56. TEMPERATURE

BLOOD PRESSURE (*Arm at heart level*)						58. PULSE (*Arm at heart level*)				
A. SITTING	SYS / DIAS	B. RECUMBENT	SYS. / DIAS.	C. STANDING (3 min.)	SYS. / DIAS.	A. SITTING	B. AFTER EXERCISE	C. 2 MIN. AFTER	D. RECUMBENT	E. AFTER STANDING 3 MIN.

59. DISTANT VISION		60. REFRACTION			61. NEAR VISION	
RIGHT 20/	CORR. TO 20/	BY	S.	CX	CORR. TO	BY
LEFT 20/	CORR. TO 20/	BY	S.	CX	CORR. TO	BY

62. HETEROPHORIA (*Specify distance*)

ES°	EX°	R. H.	L. H.	PRISM DIV.	PRISM CONV. CT	PC	PD

63. ACCOMMODATION		64. COLOR VISION (*Test used and result*)	65. DEPTH PERCEPTION (*Test used and score*)	UNCORRECTED
RIGHT	LEFT			CORRECTED
66. FIELD OF VISION		67. NIGHT VISION (*Test used and score*)	68. RED LENS TEST	69. INTRAOCULAR TENSION

70. HEARING			71. AUDIOMETER								72. PSYCHOLOGICAL AND PSYCHOMOTOR (*Tests used and score*)
RIGHT WV	/15 SV	/15		250 *256*	500 *512*	1000 *1024*	2000 *2048*	3000 *3888*	4000 *4096*	6000 *6144*	8000 *8192*	
LEFT WV	/15 SV	/15	RIGHT									
			LEFT									

73. NOTES (*Continued*) AND SIGNIFICANT OR INTERVAL HISTORY

(*Use additional sheets if necessary*)

74. SUMMARY OF DEFECTS AND DIAGNOSES (*List diagnoses with item numbers*)

75. RECOMMENDATIONS—FURTHER SPECIALIST EXAMINATIONS INDICATED (*Specify*)

76. A. PHYSICAL PROFILE

P	U	L	H	E	

77. EXAMINEE (*Check*)

A. ☐ IS QUALIFIED FOR
B. ☐ IS NOT QUALIFIED FOR

B. PHYSICAL CATEGORY

A	B	C	

78. IF NOT QUALIFIED, LIST DISQUALIFYING DEFECTS BY ITEM NUMBER

79. TYPED OR PRINTED NAME OF PHYSICIAN	SIGNATURE	
80. TYPED OR PRINTED NAME OF PHYSICIAN	SIGNATURE	
81. TYPED OR PRINTED NAME OF DENTIST OR PHYSICIAN (*Indicate which*)	SIGNATURE	
TYPED OR PRINTED NAME OF REVIEWING OFFICER OR APPROVING AUTHORITY	SIGNATURE	NUMBER OF ATTACHED SHEETS

☆ U.S. GOVERNMENT PRINTING OFFICE : 1977—O 241

STANDARD FORM 93
JANUARY 1971
GSA FPMR 101-11.8

Approved
Office of Management and Budget No. 29-R0191

REPORT OF MEDICAL HISTORY

(THIS INFORMATION IS FOR OFFICIAL AND MEDICALLY-CONFIDENTIAL USE ONLY AND WILL NOT BE RELEASED TO UNAUTHORIZED PERSONS)

1. LAST NAME—FIRST NAME—MIDDLE NAME		2. SOCIAL SECURITY OR IDENTIFICATION NO.
3. HOME ADDRESS *(No. street or RFD, city or town, State, and ZIP CODE)*		4. POSITION (Title, grade, component)
5. PURPOSE OF EXAMINATION OCCUPATIONAL EXPOSURE TO IONIZING RADIATION ( )	6. DATE OF EXAMINATION	7. EXAMINING FACILITY OR EXAMINER, AND ADDRESS *(Include ZIP Code)* USS FULTON (AS 11) FPO N.Y. N.Y. 09534

8. STATEMENT OF EXAMINEE'S PRESENT HEALTH AND MEDICATIONS CURRENTLY USED *(Follow by description of past history, if complaint exists)*

I AM IN _____ HEALTH (EXCEPT FOR BELOW) AND AM CURRENTLY

TAKING _____ _____ AS A PRESCRIBED MEDICATION

9. HAVE YOU EVER *(Please check each item)*			10. DO YOU *(Please check each item)*		
YES	NO	(Check each item)	YES	NO	(Check each item)
		Lived with anyone who had tuberculosis			Wear glasses or contact lenses
		Coughed up blood			Have vision in both eyes
		Bled excessively after injury or tooth extraction			Wear a hearing aid
		Attempted suicide			Stutter or stammer habitually
		Been a sleepwalker			Wear a brace or back support

11. HAVE YOU EVER HAD OR HAVE YOU NOW *(Please check at left of each item)*

YES	NO	DON'T KNOW	(Check each item)	YES	NO	DON'T KNOW	(Check each item)	YES	NO	DON'T KNOW	(Check each item)
			Scarlet fever, erysipelas				Cramps in your legs				"Trick" or locked knee
			Rheumatic fever				Frequent indigestion				Foot trouble
			Swollen or painful joints				Stomach, liver, or intestinal trouble				Neuritis
			Frequent or severe headache				Gall bladder trouble or gallstones				Paralysis (include infantile)
			Dizziness or fainting spells				Jaundice or hepatitis				Epilepsy or fits
			Eye trouble				Adverse reaction to serum, drug,				Car, train, sea or air sickness
			Ear, nose, or throat trouble				or medicine				Frequent trouble sleeping
			Hearing loss				Broken bones				Depression or excessive worry
			Chronic or frequent colds				Tumor, growth, cyst, cancer				Loss of memory or amnesia
			Severe tooth or gum trouble				Rupture/hernia				Nervous trouble of any sort
			Sinusitis				Piles or rectal disease				Periods of unconsciousness
			Hay Fever				Frequent or painful urination				Occupational Exp to Ion Rad
			Head injury				Bed wetting since age 12				Therapeutic Exp to Ion Rad
			Skin diseases				Kidney stone or blood in urine				or Radiopharmaceuticals
			Thyroid trouble				Sugar or albumin in urine				Worked on Unsealed Radium
			Tuberculosis				VD—Syphilis, gonorrhea, etc.				Anemia
			Asthma				Recent gain or loss of weight				Cancer or precancerous lesions
			Shortness of breath				Arthritis, Rheumatism, or Bursitis				Cataracts
			Pain or pressure in chest				Bone, joint or other deformity				Family history of; cancer,
			Chronic cough				Lameness				anemia, cataracts
			Palpitation or pounding heart				Loss of finger or toe	12. FEMALES ONLY: HAVE YOU EVER			
			Heart trouble				Painful or "trick" shoulder or elbow				Been treated for a female disorder
			High or low blood pressure				Recurrent back pain				Had a change in menstrual pattern

WHAT IS YOUR USUAL OCCUPATION?

14. ARE YOU (Check one)
☐ Right handed ☐ Left handed

S/N 0108-200-7420

PLATE NO. 22151(FRONT)

YES	NO	CHECK EACH ITEM YES OR NO. EVERY ITEM CHECKED YES MUST BE FULLY EXPLAINED IN BLANK SPACE ON RIGHT	
		15. Have you been refused employment or been unable to hold a job or stay in school because of: A. Sensitivity to chemicals, dust, sunlight, etc.	
		B. Inability to perform certain motions.	
		C. Inability to assume certain positions.	
		D. Other medical reasons (*If yes, give reasons.*)	
		16. Have you ever been treated for a mental condition? (*If yes, specify when, where, and give details.*)	
		17. Have you ever been denied life insurance? (*If yes, state reason and give details.*)	
		18. Have you had, or have you been advised to have, any operations? (*If yes, describe and give age at which occurred.*)	
		19. Have you ever been a patient in any type of hospitals? (*If yes, specify when, where, why, and name of doctor and complete address of hospital.*)	
		20. Have you ever had any illness or injury other than those already noted? (*If yes, specify when, where, and give details.*)	
		21. Have you consulted or been treated by clinics, physicians, healers, or other practitioners within the past 5 years for other than minor illnesses? (*If yes, give complete address of doctor, hospital, clinic, and details.*)	
		22. Have you ever been rejected for military service because of physical, mental, or other reasons? (*If yes, give date and reason for rejection.*)	
		23. Have you ever been discharged from military service because of physical, mental, or other reasons? (*If yes, give date, reason, and type of discharge: whether honorable, other than honorable, for unfitness or unsuitability.*)	
		24. Have you ever received, is there pending, or have you applied for pension or compensation for existing disability? (*If yes, specify what kind, granted by whom, and what amount, when, why.*)	

I certify that I have reviewed the foregoing information supplied by me and that it is true and complete to the best of my knowledge.
I authorize any of the doctors, hospitals, or clinics mentioned above to furnish the Government a complete transcript of my medical record for purposes of processing my application for this employment or service.

TYPED OR PRINTED NAME OF EXAMINEE	SIGNATURE

NOTE: HAND TO THE DOCTOR OR NURSE, OR IF MAILED MARK ENVELOPE "TO BE OPENED BY MEDICAL OFFICER ONLY."

25. Physician's summary and elaboration of all pertinent data (*Physician shall comment on all positive answers in items 9 through 24. Physician may develop by interview any additional medical history he deems important, and record any significant findings here.*)

TYPED OR PRINTED NAME OF PHYSICIAN OR EXAMINER	DATE	SIGNATURE	NUMBER OF ATTACHED SHEETS

REVERSE OF STANDARD FORM 93

PLATE NO. 22151(BACK)

Standard Form 513
General Services Administration and
Interagency Committee on Medical Records
FPMR 101-11.808-8
October 1975

c48—16—83495-1

CLINICAL RECORD — CONSULTATION SHEET

REQUEST

TO:	FROM: (*Requesting ward, unit, or activity*)	DATE OF REQUEST

REASON FOR REQUEST (*Complaints and findings*)

SLIT LAMP EXAMINATION IN ACCORDANCE WITH NAV MED P-5055 ☐ PE ☐ SE

FOR OCCUPATIONAL EXPOSURE TO IONIZING RADIATION ☐ TE

AGE _____ ☐ OTHER _____

PROVISIONAL DIAGNOSIS

DOCTOR'S SIGNATURE	APPROVED	PLACE OF CONSULTATION ☐ BEDSIDE ☐ ON CALL	☐ EMERGENCY ☐ ROUTINE

CONSULTATION REPORT

DISTANT VISION:		NEAR VISION:		TONOMETRY: A NCT S
OD 20/	CORR TO 20/	OD 20/	CORR TO 20/	OD
OS 20/	CORR TO 20/	OS 20/	CORR TO 20/	OS

DILATION WITH: 1% TROPICAMIDE and 2½% PHENYLEPHRINE HCL

OPHTHALMOSCOPY:

SLIT LAMP:

SUMMARY OF DEFECTS/DIAGNOSIS:

NCD ☐ CD ☐

SUBMIT FOR REVIEW: ☐ YES ☐ NO

(*Continued on reverse side*)

SIGNATURE AND TITLE	DATE	IDENTIFICATION NO.	ORGANIZATION

PATIENT'S IDENTIFICATION (*For typed or written entries give: Name—last, first, middle, grade; date; hospital or medical facility*)

REGISTER NO.	WARD NO.

NAME:

RATE/RANK:

SSN:

COMMAND:

PHONE:

CONSULTATION SHEET
Standard Form 513
513-106

BUMED APPROVED OVERPRINT 12/81

USS _____

FPO _____

From: Commanding Officer, _____

To:

This report is submitted to you on termination of your naval service in accordance with paragraph 5-2(3)(c) of NAVMED P-5055, "Radiation Health Protection Manual." You should preserve this report for future reference.

REPORT OF OCCUPATIONAL EXPOSURE TO IONIZING RADIATION

Name (Last, first, middle)			Date of Birth		Social Security NO.		
Place where Exposure Occurred (Commands)	Date of Employment*		EXPOSURE INFORMATION (REM)				
					WHOLE BODY DOSE		
	FROM Day-Mo-Yr	TO Day-Mo-Yr	SKIN DOSE	EXTREMITY DOSE	GAMMA & X-Ray	NEUTRON	TOTAL LIFETIME

Remarks:

*Involving Radiation

Your permissible lifetime whole body dose calculated in accordance with universally accepted standards (maximum permissible dose = 5(N-18)) is _____rem.

_____
Signature

Copy to:
BUMED (Code 3C2)
Assistant Director for Workers' Compensation and Radiation Records
Division of Operation Safety
Department of Energy
Washington, D.C. 20545

Appendix A to Enclosure (4)

(REVERSE BLANK)

REPORT TO THE PARENT COMMAND OF VISITOR OR TRANSFERRED PERSONNEL

6470
Serial
Date

From: Commanding Officer, _____
To: Commanding Officer, _____

Subj: Record of Personnel Exposure to Ionizing Radiation; forwarding of

1. During the period of _____ to _____

_____
LAST NAME FIRST INITIAL SOCIAL SECURITY NUMBER (optional)

was exposed to _____ rem (whole body) of ionizing radiation.

2. The below information is for entry on the above named individual's DD Form 1141 in his Health Record. (Unless otherwise indicated all readings given will be expressed in rem.)

ACTIVITY	FROM (Day-Mo-Yr)	TO (Day-Mo-Yr)	SKIN DOSE (SOFT)	GAMMA AND X-RAY	NEUTRON	TOTAL THIS PERIOD	TOTAL LIFE-TIME	PERMIS-SIBLE LIFETIME	PERSON MAKING ENTRY

Appendix B to Enclosure (3)

(REVERSE BLANK)

VISITORS DATA RECORD/MEDICAL STATEMENT 12 JAN 1982

Article 240 of NAVSEA 389-0153 and/or Article 207 of NAVSEA-TW120-AA-PRO-010 requires a visitor to provide the information requested below. Please print and fill in all the blanks to the double line.

Name: _____ Rank/Rate _____
Last First MI

Social Security Number: _____ Date of Birth: _____
MO DAY YR

COMPLETE address of the custodian of your medical or personnel records:

_____
ORGANIZATION

_____
Street City State Zip

STATEMENT OF VISITOR:

1. My radiation exposure for the current calendar quarter is _____ mrem and for the current calendar year is _____ mrem. If my radiation exposure is unknown or estimated, I certify that to the best of my knowledge, I have not exceeded 0.5 rem for the calendar year.

2. I know of no medical disqualification which should prevent my receiving a radiation dose within prescribed Federal Standards.

3. I understand the radiation exposure limits applicable to me during this visit and I am aware of the radiation areas within this activity from which I must remain clear. I am aware that the Navy has established a radiation control level of 0.5 rem per year for external whole body radiation exposure for the purpose of reducing total man-rem from Naval nuclear propulsion plants and from storing, handling and maintaining Navy nuclear weapons. This radiation control level is the same as the Federal limit for members of the general public and is one tenth the Federal limit for occupational exposure. Although all radiation exposures may be considered harmful, the Navy's radiation control level for the Nuclear Propulsion Plant and Nuclear Weapons Radiological Controls Programs is such that no detectable biological effects are expected even if exposures continue for a lifetime at this annual level.

4. I will return any exposure monitoring devices issued to me to the issuing authority on completion of this visit.

5. My unit, organization, or company (does/does not/unknown) maintain a dosimetry program, the results of which are reported to the Navy Bureau of Medicine and Surgery.

_____
Signature Date

STATEMENT OF INSTRUCTION CONCERNING RADIATION EXPOSURE TO THE UNBORN CHILD:
(Female visitors only) "The recommendations of the National Council on Radiation Protection and Measurements to limit radiation exposure to the unborn child to the very lowest practicable level, not to exceed 0.5 rem during the entire period of pregnancy, have been explained to me."

Signature _____ Date _____

Typed or printed name _____

PERSONNEL DOSIMETRY ENDORSEMENT

Type of TLD issued: _____ TLD serial number _____
Exposure period: From _____ To _____
Exposure assigned _____ mrem
Report forwarded to parent command, as required: _____
Date

_____
Signature

Appendix A to Enclosure (3)

(REVERSE BLANK)

List of Required Documents

1. Manuals and Instructions

NAVSEA 389-0153
NAVSEA TW 120-AA-PRO-10, REV 2
NAVMED P-5055, ACN-4
NAVELEX 0967-LP-456-6010
COMSUBLANT 6470.2A
BUMED 6470.10
SHIPSINST 6470.10
SHIP Propulsion Plant and Nuclear Weapons Accident/Incident Bill
SHIPINST for Man-Rem Reduction

2. Current Sailing List delineating each individual's status in accordance with CSL 6470.2A

3. Health Records of both Nuclear Propulsion Radiation Workers and Nuclear Weapons Radiation Workers.

4. Dosimetry Records (for the past six months including current month)

Exposure Record Cards
TLD Reader Check Records
TLD Calibration Log
NAVMED 6470/3
Lost/Damaged TLD reports

5. Routine Reports

NAVMED 6470/1, Situational Report (six months)
NAVMED 6470/1, Annual Report (preceeding 2 reports)
Monthly Report to CO (preceeding six months)
Quarterly TLD Procedures Audit (preceeding six months)
Semi-annual Radiation Health Program Internal Audit
Semi-annual Radiation Health Program External Audit
Annual Summary of Exposure to NAVSEA (08)
Annual Summary of Exposure to NAVSEA (64)
Reports of Corrective action to ORSE & Radiation Health Audits
Visitors Data Records/Medical Statement Appendix A, Encl (3) CSL 6470.2A as applicable

6. Correspondence

Reports of visitor exposure to parent commands
Statements to individuals summarizing total occupational radiation exposure on detachment
Reports forwardng exposure data of transferred personnel to a new command

7. Non-Routine Reports

Reports of personnel exceeding radiation exposure limits to BUMED (MED 6470-2)
Reports of personnel exceeding radiation exposure limits to NAVSEA (08)
Incident Reports IAW Article 110 NAVSEA 389-0153

8. Training Records

Article 106.3, NAVSEA 389-0153
Appendix B, Encl (2), COMSUBLANT 6470.2A (Non Occ)
Appendix A, Encl (2), COMSUBLANT 6470.2A (PPNO for Nuc Weps)
Written exams for Article 204 TW 120-AA-PRO-10
Qualification cards for
    EWS Article 106, NAVSEA 389-0153 (Rad Con Aspects)
    TLD Reader
Article 107, NAVSEA 389-0153 for HM
Written exam and Scores Article 106 & 107
Qualification Board Report for HM as Radiation Health Officer

9. Decontamination Locker Inventory

10. Man-Rem Reduction

Reports, graphs, charts, critiques and planning records

From: Commander, Submarine Squadron _____ (or Medical Officer, Submarine Squadron (_____)
To: Commanding Officer, USS ALWAYSAIL (SSN 007)

Subj: Semi-annual Radiation Health Audit; scheduling of

Ref: (a) NAVSEA 389-0153
(b) NAVMED P-5055

Encl: (1) List of Required Documents

1. In accordance with references (a) and (b), a semi-annual audit of the Radiation Health Program aboard USS ALWAYSAIL (SSN 007) will be conducted on 1 and 2 June 1982. It is requested that all documents listed in enclosure (1) be assembled prior to the audit to prevent unnecessary delay in completing the audit.

I. M. COMMODORE

APPENDIX

B

INSERT FIGURE II-8 PAGE II-30 FROM NAVSEA 389-0153

THERMOLUMINESCENT DOSIMETRY EVALUATION
NAVMED 6470/3 (Rev. 11-80)

INSTRUCTIONS:
1. SEE REVERSE SIDE BEFORE COMPLETING THIS FORM
2. SUBMIT ORIGINAL OF THIS FORM WITH EACH SUBMISSION OF TLD's TO THE BUMED DOSIMETRY CENTER, NATIONAL NAVAL MEDICAL CENTER, BETHESDA, MD 20014

2. FACILITY CODE

3. DATE SUBMITTED

1. ACTIVITY SUBMITTING REPORT *(Name and Address)*

4. NAME *(Last and Initials)*	5. SOCIAL SECURITY ACCOUNT NUMBER	6. TLD NUMBER	7. PERIOD OF EXPOSURE						8. RADIATION TYPE	DOSE EVALUATION IN REM				
			ISSUED			COLLECTED				9. X-RAY	10. GAMMA	11. NEUTRON	12. TOTAL	13. EXTREMITIES
			YR	MO	DA	YR	MO	DA						

14. REMARKS

15. SUBMITTED BY	16. DATE RECEIVED	17. DATE RELEASED	18. APPROVED BY	Page ____ of ____

(viii)

INSTRUCTIONS

The following instructions are applicable to the numbered items on the other side of the form.

1. List complete name and mailing address of submitting activity, including zip code.

2. List six digit Facility Code as described in Chapter 5, NAVMED P-5055.

3. Record date on which the report is submitted.

4. List last name and initials of personnel to whom the dosimeter was issued. CONTROL TLD's shall be listed before the personnel dosimeters. Use the terms POSTED TLD for dosimeters posted on the polyethylene block and AREA MONITOR for those inserted in the polyethylene cylinder. POSTED and AREA dosimeters are to be listed after the personnel dosimeters.

5. List social security number for all personnel to whom dosimeters were issued. List the serial number of card one placed in the Posted or Area monitor.

6. List the six digit serial number as it appears on the TLD card. List the serial number of card two placed in the Posted or Area monitor.

NOTE: Organize TLD's in the same order as listed when submitting for evaluation.

7. List dates of issue and collection for each dosimeter.

8. Use one of the following numerical codes to indicate the type(s) of radiation exposure to be evaluated for each dosimeter:

1. X-ray 2. Gamma 3. Neutron 4. Gamma and Neutron
5. Extremities – x-ray 6. Extremities – gamma

9. through 13. Leave Blank

14. Use as appropriate by submitting or processing activity.

15. Legible signature and title of person submitting report.

16, 17 and 18. Leave blank. For use by processing facility.

INSERT FIGURE II-6 PAGE II-28 FROM NAVSEA 389-0153

EXPOSURE TO IONIZING RADIATION
NAVMED 6470/1 (5-70) *(For instructions, see reverse side of sheet)*
0105-LF-215-6000

☐ ANNUAL ☐ REPORT OF PERSONNEL EXPOSURE TO IONIZING RADIATION (REPORT SYMBOL MED 6470-1)

☐ SITUATIONAL ☐ REPORT OF PERSONNEL EXCEEDING RADIATION EXPOSURE LIMITS (REPORT SYMBOL MED 6470-2)

1. ACTIVITY *(Name and address)*	2. REPORTING FACILITY CODE CC 4-9	3. CALENDAR YEAR REPORTED	4. DATE PREPARED

5. NAME *(Last, first, initial)*	6. SOCIAL SECURITY ACCOUNT NUMBER	7. BIRTH DATE		PERIOD OF EXPOSURE						DOSE THIS PERIOD			ACCUMULATED DOSE	
				8. FROM			9. TO			10. SKIN DOSE (REM)	11. X-RAY AND GAMMA (REM)	12. NEUTRON (REM)	13. THIS PERIOD (REM)	14. TOTAL LIFETIME (REM)
		YR	MO	YR	MO	DY	YR	MO	DY					
CC 10-28	CC 29-37	38-39	40-41	44-45	46-47	48-49	50-51	52-53	54-55	CC 56-60	CC 61-65	CC 66-70	CC 71-75	CC 76-80

15 REMARKS *(Continue on additional sheet if necessary)*

16. SIGNATURE *(Dosimetry Technician)*

17. APPROVED: *(Radiation Health Officer or Medical Officer)*

TITLE

INSTRUCTIONS

Personnel Exposure to Ionizing Radiation (Report Symbol MED 6470-1)
Personnel Exceeding Radiation Exposure Limits (Report Symbol MED 6470-2)

1. General

a. This dual purpose form may be used for either report but the reports must not be combined on the same form.

b. These reports are required on all personnel in the Naval Establishment who have been or are being occupationally exposed to Ionizing Radiation. It shall be the responsibility of each activity of the Naval Establishment having personnel so exposed to submit these reports to BUMED, Code 74, in duplicate in accordance with the following time periods.

1. Report Symbol MED 6470-1 - Report of Personnel Exposure to Ionizing Radiation shall be submitted annually to BUMED, Code 74, in duplicate by 31 January each year and shall include all personnel on board 31 December who incurred such exposure at any time during the calendar year at the reporting activity.

2. Report Symbol MED 6470-1 - Report of Personnel Exposure to Ionizing Radiation must also be prepared and submitted as a situational report if an individual so exposed was transferred, or terminated employment during the calendar year. This report shall be submitted to BUMED, Code 74, in duplicate by the activity at which the exposure was incurred, within 6 weeks of such transfer or termination. Data for the Report Symbol MED 6470-1 shall be obtained from the individual's DD 1141, Record of Occupational Exposure to Ionizing Radiation.

3. Report Symbol MED 6470-2 - Report of Personnel Exceeding Radiation Exposure Limits is required on all personnel in the Naval Establishment who have exceeded radiation exposure limits. It shall be the responsibility of the activity at which the limits were exceeded to submit this report in duplicate to BUMED, Code 74. A copy of the report shall be attached to each individual's DD 1141 for permanent retention. If personnel have received a dose of more than 3 rem in any one calendar quarter, the report shall be forwarded within 30 days from the determination of such exposure. If personnel have received a dose of more than 5 rem in a single incident, a report shall be forwarded within 24 hours from the determination of such exposure. If any individual has received a dose of more than 25 rem in a single incident, Chief, Bureau of Medicine and Surgery, shall be notified immediately by priority message.

2. Specific Coding Instructions

a. Check the appropriate boxes to indicate which report is being submitted and if the report being submitted is an Annual or Situational Report.

b. Item.

1. Enter name and address of reporting activity.

2. Enter Reporting Facility Code. Refer to Chapter 5 of the Radiation Health Protection Manual for instructions for devising the Reporting Facility Code.

3. Enter Calendar Year Reported.

4. Enter Date Reported.

5. Enter Name as currently carried on rolls - last name, first name, and middle initial, as appropriate. If this combination exceeds 19 spaces, enter last name and initials only.

6. Enter individual's Social Security Account Number.

7. Enter individual's year and month of birth.

8. Enter year, month and day exposure was considered to have started, i.e. 69-10-27.

9. Enter year, month and day exposure was considered to have ended i.e. 69-12-26.

10. through 14. Enter radiation doses received to three decimal places, i.e. 03.450. Enter doses evaluated as "zero" as 00.000. Do not use "X's" or term minimal.

10. Enter "Skin Dose", soft in rem (Roentgen Equivelant, Man) which includes low energy Gamma, X-ray of less than 20 KEV effective energy and Beta radiation.

11. Enter X-ray and Gamma dose in rem.

12. Enter Neutron dose in rem.

13. Enter accumulated dose for this period; sum of items 11 and 12.

14. Enter total lifetime accumulated dose in rem.

15, 16, 17. Self Explanatory.

Reporting Procedures are explained in detail in Chapter 5 of NAVMED P-5055, Radiation Health Protection Manual.

Standard Form 600
General Services Administr[ation] and
Interagency Committee on Med[ical] Records
FPMR 101-11.806-8
October 1975

HEALTH RECORD	CHRONOLOGICAL RECORD OF MEDICAL CARE
DATE	SYMPTOMS, DIAGNOSIS, TREATMENT, TREATING ORGANIZATION *(Sign each entry)*

PATIENT'S IDENTIFICATION *(Use this Space for Mechanical Imprint)*

PATIENT'S NAME *(Last, First, Middle initial)*			SEX
YEAR OF BIRTH	RELATIONSHIP TO SPONSOR	COMPONENT/STATUS	DEPART/SERVICE
SPONSOR'S NAME			RANK/GRADE
SSAN OR IDENTIFICATION NO.		ORGANIZATION	

CHRONOLOGICAL RECORD OF MEDICAL CARE

Standard Form 600
600-106

DATE	SYMPTOMS, DIAGNOSIS, TREATMENT, TREATING ORGANIZATION *(Sign each entry)*

*U. S. GOVERNMENT PRINTING OFFICE : 1981 0 - 341-526 (6251)

TLD READER PROFICIENCY GUIDE: Operating Procedures

Name:_____ Rate:_____ Date:_____

Ref: RADCONMAN, Article 233 and OP PROCEDURE NAVELEX 6010

1. Was the Zero Reference Level Check properly performed? _____

2. Was the Digital Display Check obtained properly? _____

3. Did the operator observe the reference light source value on the calibration sticker affixed to the CP1112/PD front panel? _____

4. Did the average of the Reference Light Standard Value fall within + - 1% of the RLV on the panel? _____

5. If not, was the adjustment(s) performed correctly and was it recorded? _____

6. Was the strip chart checked for an adequate supply of strip chart paper? _____

7. Was the chart recorder zero check performed properly? _____

8. Was the Gain Check performed properly? _____

9. Was the operator aware of the agreement necessary between chart recorder and digital dispalay? _____

10. Did the Heater Current read exactly 6.0 amperes? _____

11. Were 75 mr TLD's available? _____

12. Did the first detector read + - 15% of precalibrated exposure? _____

13. Was the operator aware of the procedure to follow if either of the other two detectors did not read within + - 15% of the precalibrated exposure? _____

14. Did the operator wear disposable rubber gloves and examine the detector element for damage? _____

15. Were an assortment of precalibrated TLD's available? _____

16. Did all readings on the digital display agree + - 25% of the strip chart recorder data? _____

17. Was the operator aware of this requirement? _____

18. Could the operator properly interpret the chart recorder reading independent of the digital display? _____

19. Were 75mr results recorded on 15C TLD reader check record? _____

Remarks:_____

Auditor:

DECONTAMINATION LOCKER INVENTORY

SOURCE DOCUMENT: BUMED 6470.10 AND AUTHORIZED MEDICAL ALLOWANCE LIST

(ADDITIONAL REQUIREMENTS BY_____MEDICAL DEPARTMENT)

ITEM	U/I	A/I	ITEM	U/I	A/I
APPLICATOR COTTON	PG	2	TAPE, ADHESIVE	RO	1
SPONGE, 4X4	PG	1	TAPE, RAD	RO	1
CLIPPER, HAIR	EA	1	PENCIL, GREASE	EA	1
CLIPPER, NAIL	EA	1	PENCIL, MECH	EA	1
BRUSH, SCRUB	EA	15	PEN, BALLPOINT	EA	1
SCISSORS, BAND	EA	1	LABELS, GUMMED	PG	1
SCISSORS, IRIS	EA	1	BAG, POLY SM	EA	8
SCISSORS, MAYO	EA	1	BAG, POLY LG	EA	2
FORCEPS, SPLINTER	EA	1	BAG, ZIP-LOC	EA	12
FORCEPS, DRESS	EA	1	PAPER, FILTER	PG	2
SOAP, PHISOHEX	CO	3	GLOVES, SURG	PR	1
PAD, ALCOHOL	PG	1	GLOVES, POLY	PR	1
CORNMEAL/DETER MIX	PG	3	GLOVES, COT WHITE	PR	1
CITRIC ACID SOL	QT	1	TOWELING	FT	18
EDTA SOL 1%	QT	1	DEIONIZED WATER	QT	1
POT PERMAN SOL	QT	1	HYDROGEN PEROXIDE	LB	1
NASO3 ACID SOL	QT	1			

APPROVED:

RADIATION HEALTH OFFICER

NON-OCCUPATIONAL RADIATION EXPOSURE STATEMENT FOR SUBMARINE PERSONNEL

1. As a non-occupational radiation exposure person I acknowledge the following:

a. My whole body exposure should not exceed 00.125 rem/quarter or 00.500 rem/calendar year.

b. To distinguish myself from personnel permitted to receive occupational radiation exposure my TLD is white in color. I wear a white TLD to verify that I will not receive occupational radiation exposure.

c. I am not permitted to enter:

(1) High radiation areas.
(2) Shielded volume of reactor compartments.
(3) Controlled surface contamination areas.
(4) Area surrounding controlled surface contamination areas.

d. I am not permitted to:

(1) Touch or directly handle radioactive material.
(2) Touch or directly handle containers or piping systems containing radioactive material except portable radiac equipment with attached sources.

2. I (have/have not) worn dosimetry equipment during the current quarter or calendar year. If equipment was worn my radiation exposure received is _____ mrem for the current quarter and _____ mrem for the current year.

3. I have been indoctrinated in the following:

a. The need to consult radiological control personnel when questions or incidents occur.

b. The specific areas I am allowed to enter.

c. The importance of not violating instructions on radiation warning signs or from radiological control personnel.

d. The applicable responsibilities of the Notice to Personnel (NAVSEA 0989-017-5070).

Appendix B to Enclosure (2)

4. (For personnel on Nuclear Weapons capable submarines only) I have read Appendix A to NAVSEA TW120-AA-PRO-010, received training in, and understand the following:

a. Objectives of the Nuclear Weapons Radiological Controls Program.

b. The biological effects of low-level radiation on personnel.

c. The need for minimizing exposure to radiation (man-rem reduction).

5. I know of no medical disqualification which should prevent my receiving a radiation dose within prescribed Federal Standards.

_____ _____

DATE SIGNATURE

_____

TYPED OR PRINTED NAME

RADIATION RECORD

SHIP/STATION _____ DATE _____
(Where exposure occurred)

READ PRIVACY ACT STATEMENT ON REVERSE PRIOR TO COMPLETING THIS FORM

LAST NAME FIRST NAME M. I. (Print/Type)	GRADE/RANK	SSN	DATE OF BIRTH

COMPLETE MAILING ADDRESS OF PARENT OR SPONSORING COMMAND (INCLUDE ZIP CODE)

RADIATION EXPOSURE HISTORY

My radiation exposure (other than medical or natural background) for the current calendar quarter and calendar year are:

Calendar Quarter _____ REM Calendar Year _____ REM

If my radiation exposure is unknown or estimated, I certify that to the best of my knowledge, I have not exceeded 0.5 REM for this calendar year.

I know of no potentially disqualifying medical conditions (such as a history of extensive radiation treatments) which should prevent my receiving radiation exposure within prescribed Federal standards.

RADIOLOGICAL CONTROLS

I understand that radiation exposures from Navy nuclear weapons must be controlled to as low as reasonably achievable. A radiation control level of 0.5 rem per year has been established for external whole body radiation exposure for the purpose of reducing total man-rem from stowing, handling and maintaining Navy nuclear weapons. This radiation control level is the same as the Federal limit for a member of the general public and is one-tenth the Federal limit for occupational exposure. Although all radiation exposure involves risk, the radiation control level for the Nuclear Weapons Radiological Controls Program is such that no detectable biological effects are expected even if exposures continue for a lifetime at this annual level.

I UNDERSTAND THE NECESSITY OF OBEYING RADIOLOGICAL CONTROL LIMITS, OF MINIMIZING TIME SPENT CLOSE TO NUCLEAR WEAPONS AND OF NOT VIOLATING ANY ESTABLISHED RADIOLOGICAL CONTROL BOUNDARIES.

FOR PERSONNEL ATTACHED TO THIS COMMAND

☐ Ship and station personnel other than nuclear weapons workers check here and sign below to verify that you understand the briefing you received.

VISITING PERSONNEL CHECK BOX INDICATING STATUS AT PARENT/SPONSORING COMMAND. COMPLETE APPROPRIATE SECTION AND SIGN BELOW TO VERIFY THAT THE INFORMATION PROVIDED IS CORRECT.

☐ VISITING NUCLEAR WEAPONS WORKERS

	Yes	No
1. Are you a member of a Nuclear Weapons Radiological Controls program at your parent/sponsoring command?		
2. Have you completed the nuclear weapons radiological control training required by Article 204 and Article 208, if applicable?		
3. Do you have your own BUMED provided LiF TLD with you for use during the visit?		
4. Does your parent/sponsoring command report your radiation exposure to BUMED? (☐ Check if unknown)		
5. Have you received a radiation medical examination within the last three years?		

☐ VISITING PERSONNEL OTHER THAN NUCLEAR WEAPONS WORKERS

	Yes	No
1. Do you understand the briefing you received?		
2. Are you aware that as a visitor the amount of radiation exposure that you can receive is extremely limited?		
3. Do you receive radiation exposure in some other radiation safety or radiological controls program?		
4. Do you have a dosimeter with you for use during this visit?		
5. Does your parent/sponsoring command report radiation exposure to BUMED? (☐ Check if unknown)		
6. Have you received a radiation medical examination within the last three years?		

DOSIMETER DATA

LiF TLD SERIAL NO. _____
DATE ISSUED _____
DATE RETURNED _____

☐ DOSIMETER ISSUE NOT REQUIRED

_____
MEDICAL DEPARTMENT REPRESENTATIVE

EXPOSURE RESULTS

_____ REM GAMMA
_____ REM NEUTRON
_____ REM TOTAL

SIGNATURE (sign in ink)	DATE

4. Examination. Satisfactorily complete a comprehensive written examination.

GRADE	M DIVISION OFFICER	DATE

5. Recommended for Qualification as a Primary Water Chemist.

LEADING ELT	DATE	M DIVISION OFFICER	DATE

6. Radiological Controls.

a. Demonstrate a detailed knowledge of the following items pertaining to Radiological Controls.

(1) Fundamentals of Radiation. _____ _____

(2) Radiation Detection and Measurement. _____ _____

(3) Biological effects of Radiation _____ _____

(4) Sources of Radiation and Radioactivity. _____ _____

(5) External Radiation Exposure limits. _____ _____

(6) Radiation Shielding _____ _____

(7) Area Monitoring for Radiation _____ _____

(8) Personnel Monitoring for Radiation Exposure. _____ _____

(9) Waste, storage and disposal procedures and limits. _____ _____

(10) Airborne Radioactivity measuring. _____ _____

(11) Procedures for controlling airborne radioactivity, including radiation casualty bill. _____ _____

(12) Surface Contamination Units. _____ _____

(13) Monitoring for Surface Contamination. _____ _____

(14) Anti-contamination Clothing. _____ _____

(15) Radioactive Decontamination. _____ _____

(16) Potable Water Contamination Limits and Monitoring Procedures. _____ _____

(17) Procedures for receiving handling, transferring and shipping radioactive materials including use of radioactive material receipt and transfer log. _____ _____

(18) Regulations, precautions and custody requirements pertaining to all radioactive sources on board and the location of those sources. _____ _____

(19) Steam Generator contamination limits and monitoring. _____ _____

7. Practical Factors. Demonstrate proficiency in the following:

a. Calculate specific activity of isotopes. _____ _____

b. Correlate units of activity and exposure. _____ _____

c. Dosimeters - calibrate, charge and issue. _____ _____

d. Use all types of portable radiological instruments. Know ranges power supply, calibration, advantages and disadvantages of each. _____ _____

e. Calculate source strength and exposure limits based on the inverse square relationship, and know how to perform beta-gamma instrument checks. _____ _____

f. Locate all fixed monitoring units and demonstrate knowledge of operating instuctions. _____ _____

g. Operate and calibrate portable air monitors. _____ _____

h. Use the counter calibration sources. _____ _____

i. Place scaler and accessories in service. _____ _____

j. Establish voltage plateau. _____ _____

k. Determine background counter efficiency. _____ _____

l. Perform complete beta-gamma surveys in high and low level areas utilizing appropriate instruments. _____ _____

m. Perform fast and thermal neutron surveys. _____ _____

n. Perform surveys and calculate integrated dose rate, establish "stay time" limits. _____ _____

o. Perform alpha surveys. _____ _____

p. Perform following swipe surveys: _____ _____

(1) Horizontal deck for beta-gamma. _____ _____

(2) Pipe, valve or component for beta-gamma. _____ _____

(3) Wet area for Beta-gamma. _____ _____

(4) Calibration source for beta-gamma. _____ _____

(5) Neutron test source transport cable for alphas. _____ _____

q. Perform and calculate results of potable water surveys. _____ _____

r. Establish or simulate control station, prescribe proper anti-C equipment to be used during maintenance and make provision for control of contaminated articles. _____ _____

s. Decontaminate an area and component. _____ _____

t. Demonstrate personal decontamination. _____ _____

u. Demonstrate knowledge of radiation shielding utilizing appropriate shielding materials. Understand "half-thickness". _____ _____

v. Establish the required Radiological controls during radiographing. _____ _____

w. Demonstrate understanding of RCLL surveys and check point surveys required by the Reactor Plant Manual with regard to the following: _____ _____

(1) Location of survey points and check points. _____ _____

(2) Frequency of surveys (including demineralizer surveys). _____ _____

8. Qualification for TLD Reader.

a. Discuss all the requirements of Article 233 and 234 of 389-0153 concerning radiation monitoring and personnel exposure control. _____ _____

b.	Discuss applicable instructions for TLD monitoring and personnel exposure.	_____	_____
c.	Discuss with the ship's medical representative his responsibilities and interrelation with ELTs with respect to the TLD program.	_____	_____
d.	Discuss with a qualified TLD reader the importance & method of evaluating glow curves.	_____	_____
e.	Discuss and be familiar with the theory behind and operation of the TLD reader as discussed in the TLD reader Tech manual.	_____	_____
f.	Expose a TLD for calibration and calibrate the TLD reader.	_____	_____
g.	Read five TLDs of various exposures and properly document the results.	_____	_____
h.	Demonstrate how to properly initiate a new card and TLD for personnel reporting on board.	_____	_____

10. Examination. Satisfactorily completed comprehensive written examination.

GRADE	M DIVISION OFFICER	DATE

11. Orally examined and recommended for Qualification in Radiological Controls.

LEADING ELT	DATE	M DIV OFFICER	DATE

12. After satisfactory completion of Parts 1 through 9, stand watch under supervision of a qualified ELT until proficiency is demonstrated to the leading ELT.

LEADING ELT	DATE

13. Orally examined and qualified as ELT.

ENGINEER OFFICER	DATE

14. Requalified as ELT.

ENGINEEER OFFICER	DATE

15. Requalified as ELT.

ENGINEER OFFICER	DATE

TLD QUALIFICATION CARD

Name: _____ Rate: _____ Date Qual Started: _____

References: (a) NAVSEA 389-0153
(b) NAVELEXINST 0967-456-6010

Knowledge Requirements:	Date	Signature
a. Construction of TLDs		
b. Principles of operation of TLD		
c. Principles of operation of TLD reader		
d. Differences between Calcium and Lithium Fluoride TLDs		
e. Records required for issue, reading and testing TLDs		
f. Records required for checks of TLD Reader		
g. Requirements for wearing TLD		
h. Requirements for non-occupational exposure		
i. Requirements for divers		
j. Requirements for visitors		
k. Requirements for reading TLD's		
l. Interpretation of glow curves		
m. Requirements for abnormal cal check		
n. Alert List		
o. Individual MAN REM expenditure record		
p. Actions required when strip chart and digital displays do not agree		
q. Actions required to adjust doses for TLDs read following a satisfactory reference light check when subsequent reference light check falls out of calibrated standard by more than 25%		
r. Actions required to read accident TLDs		
2. Practical Factors:		
a. Perform light source check of TLD reader		
b. Perform 75 mrem cal check on TLD reader		
c. Demonstrate adjustment of stylus		
d. Fill out all the required forms prior to issuing TLD:		
(1) 15A		
(2) 15B		
(3) 15C		
(4) Non-occupational exposure form		
(5) Strip chart		

e. Discuss light source calculation
f. Read exposed or test TLDs and interpret indicated and strip chart reading.
g. Discuss actions for faulty heater current and how actual exposure would be affected.

Satisfactorily complete a comprehensive written exam. Grade: _____

_____
Training Petty Officer Date

Satisfactroily complete a comprehensive oral exam.

_____
Leading Petty Officer Date

_____
ARCO Date

Above named man qualified.

_____
RCO Date

NON-NUCLEAR RADIATION CONTROLS QUALIFICATION CARD

FOR OCCUPATIONAL EXPOSURE

Ref: (a) NAVSEA 389-0153

	Signature	Date
1. Demonstrate thorough knowledge of the following areas to a qualified Engineering Laboratory Technician or Engineering Officer of the Watch:		
* a. Radiation Exposure Control (Article 107.1, reference (a)).		
b. Contamination Control (Article 107.2, reference (a)).		
c. Accountability of radioactive materials (Article 107.3, reference (a)).		
d. Waste disposal (Article 107.4, reference (a)).		
* e. Radiological incidents (Article 107.5a, reference (a)).		
* f. Responsibilities of individuals (Article 107.6 reference (a)).		
2. Demonstrate to a qualified Engineering Laboratory Technician or Engineering Officer of the Watch proficiency in performing the following practical factors:		
a. Read all types of dosimeters in use. Types read _____		
b. Put on and remove anti-contamination clothing and masks.		
c. Enter and leave a simulated contaminated area.		
d. For personnel required to work in containment areas, demonstrate proper procedure for working in these areas. (This ability may be demonstrated on a mock-up).		
e. Participate in a radioactive liquid spill drill.		

* To be completed by "A" Division Personnel

* 3. Pass a comprehensive written examination. Grade: _____ RCO _____ DATE _____

* 4. Satisfactorily completed non-nuclear radiological controls qualifications. RCO _____ DATE _____

5. Personnel requiring emergency access to radiation areas, contaminated areas, and areas where radiological materials are stowed, complete the following additional items:

a. Permission is granted to qualify in radiological controls for emergency access to radiation areas, contaminated areas, and areas where radiological materials are stowed. The intent is to provide training for situations requiring emergency action. RCO _____ DATE _____

b. Demonstrate understanding of the relationship of priorities of radiological controls versus other safety considerations in an emergency in which you may be involved to a qualified Engineering Laboratory Technician or Engineering Officer of the Watch. ELT/EOOW _____ DATE _____

c. Qualified for emergency access to radiation areas, contamination areas, and areas where radiological materials are stowed. RCO _____ DATE _____

* 6. Recertification due date: _____ (within two years of initial qualification) _____ _____

* To be completed by "A" Division Personnel

NUCLEAR WEAPONS PERSONNEL RADIATION CONTROLS QUALIFICATION CARD FOR OCCUPATIONAL EXPOSURE

Ref: (a) NAVSEA 389-0153
(b) NAVSEA TW120-AA-PRO-10

1. Demonstrate a thorough knowledge of the following areas to the Nuclear Weapons Radiological Controls Officer (NWRCO):

a. Responsibilities of personnel (Article 107, reference (b)).	_____	_____
b. Effects of low level radiation on personnel (Article 108 and Appendix A, reference (b)).	_____	_____
c. Radiation Exposure Control (Article 107.1, reference (a)).	_____	_____
d. Objectives of the nuclear weapons radiological controls program (Article 204, reference (b)).	_____	_____
e. Personnel dosimetry program (Article 204, reference (b)).	_____	_____

2. Demonstrate to the NWRCO proficiency in performing the following practical factors:

a. Put on and remove Anti-contamination clothing and masks.	_____	_____
b. Enter and leave a simulated contamination area.	_____	_____
c. Operate an AN/PDR-27, AN/PDR-56, and AN/PDR-70.		
d. Participate in a nuclear weapons accident drill.	_____	_____

3. Pass a comprehensive written examination: Grade: _____	_____ NWRCO or GRAD of NWRCO Course	_____ DATE
4. Satifactorily completed nuclear weapons radiological controls qualification.	_____ NWRCO or GRAD of NWRCO Course	_____ DATE

5. Recertification due date: _____ (Within one year of initial qualification or previous recertification).

NAVSEA 389-0153 ART. 208 TRAINING CERTIFICATION FOR NUCLEAR WEAPONS RADIATION WORKERS

1. As a person authorized to receive occupational radiation exposure associated with nuclear weapons but not authorized to receive occupational radiation exposure associated with nuclear propulsion plant I acknowledge the following:

a. I am not permitted to enter the following areas associated with the nuclear propulsion plant:

(1) High radiation areas.

(2) Shielded volume of reactor compartments.

(3) Controlled surface contamination areas.

(4) Area surrounding controlled surface contamination areas (Article 503 - NAVSEA 389-0153)

b. I am not permitted to:

(1) Touch or directly handle radioactive material associated with the nuclear propulsion plant.

(2) Touch or directly handle containers or piping systems containing radioactive material associated with the nuclear propulsion plant except portable radiac equipment with attached sources.

2. I (have/have not) worn dosimetry equipment during the current quarter or calendar year. If equipment was worn, my radiation exposure received for the current quarter is _____ mrem and _____ mrem for the current year.

3. I have been indoctrinated in the following as they pertain to the nuclear propulsion plant:

a. The need to consult radiological control personnel when questions or incidents occur.

b. The specific areas I am allowed to enter.

c. The importance of not violating instructions on radiation warning signs or from radiological control personnel.

d. The applicable responsibilities of the Notice to Personnel (NAVSEA 0989-017-5070).

_____ DATE

_____ SIGNATURE

_____ TYPED OR PRINTED NAME

Appendix A to Enclosure (2)

(REVERSE BLANK)

COMSUBLANTINST 6470.2A
12 JAN 1982

_____
(DATE)

From: Radiation Health Officer
To: Commanding Officer
Via: Executive Officer

Subj: Monthly Dosimetry Report to Commanding Officer

Ref: (a) COMSUBLANTINST 6470.2

Encl: (1) TLD Exposure Records
(2) Dosimetry Device Loss/Damage Reports
(3) Lithium Fluoride TLD Results

1. In accordance with reference (a), this report is submitted.

2. Enclosure (1) is the Personnel TLD exposure records for the month/quarter of _____.

3. _____ Lost or Damaged TLD Reports are submitted as enclosure (2).

4. Enclosure (3) is the latest results of Lithium Fluoride TLDs/photo-dosimetry (for dosimetry period _____).

5. The following personnel are on the ALERT LIST:

6. Evaluation of abnormal exposure or remarks:

_____
Date and Signature of
Radiation Health Officer

NOTED:

Executive Officer _____ _____

Commanding Officer _____

Appendix A to Enclosure (8)

TLD AUDIT PROCEDURES

1. Identification:

	Yes	No
a. Conduct a random check of a few (4 to 8) personnel to determine if they are in fact wearing the TLD that is recorded as having been issued to them. (This check should include personnel assigned LiF TLD's, if applicable.)	☐	☐
b. Are TLDs being worn properly?	☐	☐
c. Are TLDs being issued to any unauthorized personnel?	☐	☐
d. Are incorrect TLDs being issued to any personnel?	☐	☐
e. Has the radiation physical examination, if required, of all personnel issued TLD's been verified before the TLD was issued?	☐	☐

2. Issue and Collection:

a. Determine if the issue periods outlined in NAVSEA 389-0153 and NAVMED P- 5055 for various categories of personnel are being observed.	☐	☐
b. Are monthly and quarterly exposure data being forwarded to the Medical Department within five working days?	☐	☐
c. Have all personnel who have been issued a "white" CaF_2 TLD been trained in accordance with Article 208 of NAVSEA 389- 0153 and COMSUBLANTINST 6470.2A, and has this training been documented?	☐	☐
d. Has the Medical Department Representative been informed each time a "white" CaF_2 TLD has been issued?	☐	☐
e. Have all records pertaining to TLD's been retained in accordance with NAVSEA 389- 0153, NAVSEA TW120-AA-PRO-010 and NAVMED P- 5055?	☐	☐
f. Are LiF TLDs being accounted for as required by NAVMED P-5055?	☐	☐

3. Evaluation Technique:

a. Is there compliance with procedures outlined in NAVELEX 0967-456-6010 for calibration and operation of the CP- 1112/PD?	☐	☐

	Yes	No
Have unauthorized alterations or procedures been substituted?	☐	☐
b. Are the required calibration checks on the CP-1112/PD being accomplished at proper intervals during reading of the DT-526/PD dosimeters?	☐	☐
c. Has calibration of the DT-526/PD, as required by NAVSEA 389-0153, Article 233.4, been performed?	☐	☐
d. Verify that DT-526/PD calibration exposures using the TS-1189 source have been properly made.	☐	☐

4. Compilation and Transcription of Dose:

a. Select the five personnel with the highest cumulative dose for the month from amongst those who have had daily dosimeter readings and audit their reported exposures with an adding machine.	☐	☐
b. Do exposures reported from the DT-526/PD dosimeter appear to be reasonable for the job performed by the man wearing the dosimeter?	☐	☐

Previous exposure data reported for similar circumstances of work should provide a satisfactory guide for comparison.

c. Select several TLD exposure records at random and check for completeness.	☐	☐
d. Has the strip chart recorder been used for all readings of CaF_2 TLDs?	☐	☐
e. Are the doses indicated on the CaF_2 TLD reader digital display being accurately recorded on worksheets?	☐	☐
f. Are the doses indicated on the BUMED report of LiF TLDs accurately transcribed in health records?	☐	☐

5. Visitors:

a. Is there compliance with current requirements for issuance of visitor's TLDs?	☐	☐

6. Lost/Damaged TLDs:

a. Have any TLDs been lost or damaged during the preceding reporting period?	☐	☐
b. Is there evidence of compliance with the requirements for estimation of dose in the case of lost or damaged TLDs, as outlined in NAVMED P-5055 and COMSUBLANTINST 6470.2A?	☐	☐

ALL HANDS INDOCTRINATION

To minimize problems caused by the misunderstanding of personnel not directly involved with radioactivity, you are required to read and indicate by signature that you understand the following points concerning radiation. This training shall be conducted as soon as practicable after reporting aboard and repeated at least annually.

1. The radiation environment of personnel outside radiation areas and outside the (ship's name) is not significantly affected by nuclear propulsion plant work done by (ship's name). Radiation and radioactivity associated with NUCLEAR PROPUSLION WORK will not affect you provided you obey posted signs and warnings.

2. A radiation warning sign is the conventional 3 bladed purple symbol (magenta trefoil) with yellow background. All radiation areas are identified with these signs and you are to remain clear of these areas unless authorized to do otherwise. The specific areas aboard the (ship's name) which you must remain clear of include the following:

a.	NSF	Nuclear Support Activity	C-202 1/4-EL
b.	SUBROC	Weapons Area	A-418-AE
c.	RAD CAL LAB	Radiac Cal Lab	C-0109-2
d.	NDT	Non-Destructive Testing	B-020-6E

3. Radiation barriers are identified with purple and yellow RADCON tape and indicate radioactive contamination. This tape is often used to designate transportation routes for casualties, and/or potentially contaminated personnel. Personnel shall not cross over or under this tape and boundaries.

4. "RAM" tags (Radiation Material Tags) are yellow in color and are used to identify radioactive material. The tag gives surface radiation and contamination levels, name of material and specific instructions. This material must be handled by radiological control personnel only.

5. Yellow poly (plastic) bags are used for containment or transfer of radioactive material, clothing, tools, etc, or objects suspected of contamination. All other uses are <u>prohibited</u>. If you see yellow poly adrift outside the Nuclear Support Facility <u>YOU MUST</u>.

a. Stop
b. Secure the area
c. Call R-5 division (NSF) at extension 446
d. Wait for assistance from <u>RADON</u> personnel and <u>obey all insructions</u> when they arrive on the scene

6. You shall comply with instructions of Radiological Control personnel in the event of an incident or accident involving radioactivity. If the nature of the incident or accident demands ship wide involvement, an ALPHA EMERGENCY or NOVEMBER EMERGENCY will be announced over the 1MC. ALL HANDS MUSTER AT QUARTERS (unless at the scene) NO EATING, DRINKING or SMOKING will be permitted until directed by the Command Duty Officer.

7. If you intentionally violate instructions, cross boundaries or barriers and/or radiation warning signs, you may recieve exposure to ionizing radiation unnecessarily and disciplinary action may be taken against you.

NUCLEAR WEAPONS RADIOLOGICAL CONTROLS: ALL HANDS TRAINING

Ref: (a) NAVSEA TW 120-AA-PRO-10

1. In accordance with reference (a), the following information is disseminated to all hands:

This ship is capable of carrying nuclear weapons. Studies on ships of this class have indicated that you will not receive more radiation than that allowed members of the general public. A radiological controls program is in effect to insure radiation exposures are known and controlled. If you have questions contact the Nuclear Weapons Radiological Cntrols Officer.

2. The Nuclear Weapons Radiological Controls Officer is (Officer's Name) and can be contacted in sick bay at extension (phone number).

DATE_____ SIGNATURE_____

NAME (PRINT LAST FIRST INT)

DIV